SMITHSONIAN REPORT.

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EIGHTH ANNUAL REPORT

OF THE

BOARD OF REGENTS

OF THE

SMITHSONIAN INSTITUTION,

SHOWING THE

OPERATIONS, EXPENDITURES, AND CONDITION OF THE INSTITUTION
UP TO JANUARY 1, 1854.

AND THE

PROCEEDINGS OF THE BOARD UP TO JULY 8, 1854.

WASHINGTON:
A. O. P. NICHOLSON, PUBLIC PRINTER.
1854.

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33d Congress, 1st Session. [HO. OF REPS.] Miscellaneous, No. 97.

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1853

SMITHSONIAN INSTITUTION.

COMMUNICATION

FROM THE

SECRETARY OF THE SMITHSONIAN INSTITUTION,

TRANSMITTING

The Annual Report of the Board of Regents of that Institution.

August 1, 1854.—Laid upon the table, and ordered to be printed.

August 2, 1854.—Ordered that 10,000 additional copies be printed, to include the minority report on the distribution of the fund—7,000 copies for distribution by the members of the House, and 3,000 copies for said Institution.

Smithsonian Institution,
Washington, July 22, 1854.

Sir: I have the honor herewith to transmit to you the Annual Report of the Board of Regents of the Smithsonian Institution, and beg leave to request that you will present it to the House of Representatives of the United States.

I have the honor to be, very respectfully, your obedient servant,

JOSEPH HENRY,
Secretary Smithsonian Institution.

Hon. Linn Boyd,
Speaker of the House of Representatives.

EIGHTH ANNUAL REPORT

OF THE

BOARD OF REGENTS

OF THE

SMITHSONIAN INSTITUTION,

SHOWING THE

OPERATIONS, EXPENDITURES, AND CONDITION OF THE INSTITUTION UP TO JANUARY 1, 1854, AND THE PROCEEDINGS OF THE BOARD UP TO JULY 8, 1854.

To the Senate and House of Representatives:

In obedience to the act of Congress of August 10, 1846, establishing the Smithsonian Institution, the undersigned, in behalf of the Regents, submit to Congress, as a report of the operations, expenditures, and condition of the Institution, the following documents:

1. The Annual Report of the Secretary, giving an account of the operations of the Institution during the year 1853, including reports from the Assistant Secretaries, relative to the library, museum, &c.

2. Report of the Executive Committee, giving a general statement of the proceeds and disposition of the Smithsonian fund, and also an account of the expenditures for the year 1853.

3. Report of the Building Committee, relative to the progress made in 1853 in the erection of the Smithsonian edifice.

4. Proceedings of the Board of Regents and of the establishment up to July, 1854.

5. Appendix.

Respectfully submitted.

ROGER B. TANEY, *Chancellor.*
JOSEPH HENRY, *Secretary.*

JULY 22, 1854.

OFFICERS OF THE SMITHSONIAN INSTITUTION.

FRANKLIN PIERCE, *Ex-officio* Presiding Officer of the Institution.
ROGER B. TANEY, Chancellor of the Institution.
JOSEPH HENRY, Secretary of the Institution.
CHARLES C. JEWETT, Assistant Secretary, in charge of the Library, up to July 10, 1854
SPENCER F. BAIRD, Assistant Secretary, in charge of the Museum.

ALEXANDER D. BACHE,
JAMES A. PEARCE,
JOSEPH G. TOTTEN,
} Executive Committee.

RICHARD RUSH,
——— ———,
WM. H. ENGLISH,
JOSEPH HENRY,
} Building Committee.

W. W. SEATON, Treasurer.

REGENTS OF THE INSTITUTION.

——— ———, Vice President of the United States.
ROGER B. TANEY, Chief Justice of the United States.
JOHN T. TOWERS, Mayor of the city of Washington.
JAMES A. PEARCE, member of the Senate of the United States.
JAMES M. MASON, member of the Senate of the United States.
S. A. DOUGLAS, member of the Senate of the United States.
W. H. ENGLISH, member of the House of Representatives.
DAVID STUART, member of the House of Representatives.
JAMES MEACHAM, member of the House of Representatives.
RUFUS CHOATE, citizen of Massachusetts.
GIDEON HAWLEY, citizen of New York.
J. MACPHERSON BERRIEN, citizen of Georgia.
RICHARD RUSH, citizen of Pennsylvania.
ALEXANDER D. BACHE, member of the National Institute, Washington.
JOSEPH G. TOTTEN, member of the National Institute, Washington.

MEMBERS EX-OFFICIO OF THE INSTITUTION.

FRANKLIN PIERCE, President of the United States.
——— ———, Vice President of the United States.
WILLIAM L. MARCY, Secretary of State.
JAMES GUTHRIE, Secretary of the Treasury.
JEFFERSON DAVIS, Secretary of War.
JAMES C. DOBBIN, Secretary of the Navy.
JAMES CAMPBELL, Postmaster General.
CALEB CUSHING, Attorney General.
ROGER B. TANEY, Chief Justice of the United States.
CHARLES MASON, Commissioner of Patents.
JOHN T. TOWERS, Mayor of the city of Washington.

HONORARY MEMBERS.

ROBERT HARE.
WASHINGTON IRVING.
BENJAMIN SILLIMAN.
PARKER CLEAVELAND.

REPORT OF THE SECRETARY.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: Nothing of especial interest has occurred during the past year to mark an epoch in the history of the institution over which you preside. The several objects set forth in the plan of organization have been prosecuted as far as the funds which could be devoted to them would allow. A knowledge of the true character of the institution has been gradually extended, and it is a subject of gratification that the plan of operations is more highly appreciated the better it is understood. Every succeeding year which is added to the age of the institution will render it more stable, so long as it pursues undeviatingly the same course. All establishments, however, which are supported by bequests, intended to promote the public good, are necessarily subjected to the scrutiny of all who consider themselves personally interested in the trust. The managers are overwhelmed with suggestions, and subjected to illiberal criticisms, and unless they are firmly convinced of the propriety of their course, and have sufficient moral courage to pursue it notwithstanding opposition, there is danger of vacillation, and of an attempt to gain popularity by adopting measures not calculated to promote the desired end. It should, however, be recollected that opinions ought to be weighed rather than counted, and that nothing of importance can be accomplished, either by an individual or an institution, except by constant and laborious exertion in one direction. In the beginning of this institution the plans best calculated to realize the liberal intentions of the donor were adopted after due deliberation, and have been constantly adhered to and developed as far as the requisitions of Congress and the limited income would allow. From the character of James Smithson and his pursuits there can be no reasonable doubt as to his intention in regard to the bequest. He was a man familiar with the precise language of exact science, and no other construction ought to be put upon the words of his will than that which a strict interpretation will allow. He leaves his property to found an establishment which shall bear his own name, and have for its object "the increase and diffusion of knowledge among men." It would evidently be incompatible with an enlarged and just interpretation of this will to confine its benefits exclusively to one people, and especially would it be unworthy the character of a great nation to accept the administration of a bequest intended for the good of mankind, and to apply it exclusively to its own use.

Nothing apparently can be further from the truth than the idea which

was first prevalent in this country that Smithson left his money merely to diffuse practical knowledge among the people of the United States. On the contrary he intended this institution as a monument to his name which should be known of all men, and prized by the student of every branch of literature and science, which should not be restricted to merely spreading abroad the knowledge which already exists, but, above all, should be the means of enlarging the bounds of human thought. He was also too much of a philosopher to confine his bequest to the promotion of any one branch of literature or science, and therefore left the trust free to be applied to all.

His will recognises a well established and very important distinction with regard to knowledge, viz: its increase and its diffusion. These, though frequently confounded, are very different processes, and each may exist independent of the other. While we rejoice that in our country, above all others, so much attention is paid to the diffusion of knowledge, truth compels us to say that comparatively little encouragement is given to its increase.

There is another division with regard to knowledge which Smithson does not embrace in his design, viz: the application of knowledge to useful purposes in the arts; and it was not necessary he should found an institution for this purpose. There are already in every civilized country establishments and patent laws for the encouragement of this department of mental industry. As soon as any branch of science can be brought to bear on the necessities, conveniences, or luxuries of life, it meets with encouragement and reward. Not so with the discovery of the incipient principles of science. The investigations which lead to these receive no fostering care from government, and are considered by the superficial observer as trifles unworthy the attention of those who place the supreme good in that which immediately administers to the physical necessities or luxuries of life.

If physical well being were alone the object of existence, every avenue of enjoyment should be explored to its utmost extent. But he who loves truth for its own sake, feels that its highest claims are lowered and its moral influence marred by being continually summoned to the bar of immediate and palpable utility. Smithson himself had no such narrow views. The prominent design of his bequest is the promotion of abstract science. It leaves to the teacher and the teeming press to diffuse popular knowledge, and to the Patent Office and the manufacturer to facilitate and reward the application of science to the useful arts. In this respect the institution holds an otherwise unoccupied place in this country, and adopts two fundamental maxims in its policy: first, to do nothing with its funds which can be equally well done by other means; and, second, to produce results which, as far as possible, will benefit mankind in general. Any deviations from these maxims which the history of the institution may exhibit, must be referred to the original requirements of the law of Congress authorizing its establishment, and not to the plan of active operations at first proposed in the programme, and which has constantly been kept in view from the beginning until the present time.

A miscellaneous and general library, museum, and gallery of art, though important in themselves, have from the first been considered by

those who have critically examined the will of Smithson, to be too restricted in their operations and too local in their influence, to meet the comprehensive intentions of the testator; and the hope has been cherished that other means may ultimately be provided for the support of those objects, and that the whole income of the Smithsonian fund may be devoted to the more legitimate objects of the noble bequest.

I have been informed by the Commissioner of Patents that the space now occupied in the building of the Patent Office by the national museum is imperatively required for the display of models; and he suggests that a part or the whole of the Smithsonian building shall be purchased for the deposit of this collection. If Congress will entirely relieve the Smithsonian fund from the expense of collecting and maintaining a museum, a large portion of the present building would be unnecessary, and the proposition to purchase a part or the whole of it might properly be entertained. The Smithsonian Institution, if required, would take the supervision of a government museum, and would turn over to it all the specimens collected after they had been examined and described. The importance of a collection at the seat of government to illustrate the physical geography, natural history, and ethnology of the United States, cannot be too highly estimated. But the support of such a collection ought not to be a burthen upon the Smithsonian fund.

It was stated in the last report that the plan of an equal division of the income between the library and museum on the one hand, and the lectures, the publications, and researches on the other, was found not to work well in practice. It leads to inharmonious action, and to a system of expenditure by no means compatible with proper economy or the limited income of the Smithsonian fund. The subject has, however, been referred to a special committee of the Regents, which I trust will give it due consideration, and report their views during the present session of the Board.

Publications.—During the past year no diminution has taken place in the objects of interest which have presented themselves for the assistance and patronage of the institution. The amount of publications has only been limited by the appropriation which could be devoted to this purpose.

1. The first memoir published during the past year is one by Dr. Joseph Leidy, Professor of Anatomy in the University of Pennsylvania, entitled "The Ancient Fauna of Nebraska."

A considerable portion of the country between the Mississippi and the Rocky mountains consists of the more recent geological deposits, and particularly on the upper Missouri there exists a tract of country known by the name of the Mauvaises Terres, or the Bad Lands; this at one time was probably the bottom of an immense lake, in which perished thousands of animals having no representatives at this time on the surface of the earth. It appears that the waters of this lake were removed by some convulsion of nature, that the sediment at its bottom became indurated, and that afterwards the whole country was traversed by an immense wave of water, which carried away the softer parts of the strata, and left standing the harder parts in a series of irregular prismatic and columnar masses, frequently capped with

irregular pyramids, and extending upwards to a heighth of from one to two hundred feet. "Viewed in the distance, these rocky piles in their endless succession assume the appearance of massive architectural structures, with all the accessories of buttresses, turrets, and tapering spires." The portion of the surface thus excavated forms a valley of ninety miles in length and thirty in breadth, which in its most depressed portion is about three hundred feet below the surface of the surrounding country. So thickly are the natural towers studded over the surface of this extraordinary region, that the traveller threads his way through deep confined passages, which resemble the narrow irregular streets and lanes of some of the old towns of the continent of Europe. At the foot of these columns, the remains of the ancient animals, which lived and breathed long before the advent of man upon the face of the earth, are found in such abundance as to form of this tract an extensive cemetery of vertebrated animals, rivaling, in the variety of its extinct species, the celebrated beds of the Paris basin.

This region having been brought to notice by a few fossil remains procured through the agents of the American Fur Company, an appropriation of about $200 for its exploration was made by the Smithsonian Institution to Mr. Thaddeus Culbertson, who was about to visit, on account of his health, the sources of the Missouri. The specimens of fossil remains which were thus procured, together with a collection subsequently presented to the institution by Capt. Stewart Van Vliet, of the U. S. army, and several specimens kindly lent by Dr. Prout, of Missouri, were referred to Dr. Leidy for examination. In addition to these he had the use of a collection lent by Prof. O'Loghland, of Missouri, specimens belonging to the Academy of Natural Sciences, Philadelphia, and a collection made by Dr. Evans, at the instigation of Dr. D. Dale Owen, the whole embracing all the specimens which have yet been brought to the east from the Bad Lands. The bones are completely petrified, and their cavities filled with silicious matter. They are preserved in various degrees of integrity, some being beautifully perfect and others broken and imperfect, the latter having been evidently subjected to violence while imbedded in a soft mud. The animals belong to the classes mammalia and chelonia, or turtles. With a single exception, all the species of mammalia belong to the great order of ungulata or hoofed animals, of which there are seven species of four genera, which belong to the ruminantia, or cud-chewing animals; two species of one genus belonging to the paradigitata ordinaria, or even-toed animals; one species of the solipedia, or solid-hoofed animals; and four species of three genera belonging to the imparidigitata ordinaria, or uneven-toed animals.

The first specimen described belonged to a peculiar genus of ruminants which, among recent animals, is more nearly allied to the musk, and was probably hornless. The next is of a remarkable genus of ungulata, representing a type which occupies a position in the wide physiological interval existing between recent ruminants and the anomalous fossil animal called the anoplotherium. Another genus is called oreodon, and constitutes one of the links necessary to fill up the very wide gap between existing ruminants and an exceedingly aberrant form of the same family now extinct. Another organic relic is that of an

animal which combined the ruminant and carnivorous characteristics, of which there are several species. There are also two remarkable species of rhinoceros, differing from any remains of this animal found in other parts of the globe. The existing species of the rhinoceros are met with in Africa, Asia, and the islands of Java and Sumatra. Remains of extinct species have been found in Great Britain, the continent of Europe, Siberia, and the Himalayas; but no trace of this genus had previously been discovered in America. Another fossil remain belongs to the feline family, about a fifth smaller than the American panther, and is probably the most ancient known genus of this animal. Hundreds of fossil turtles are found in the "Bad Lands;" they belong to the genus testudo, of which five species are described in this paper.

The memoir occupies one hundred and twenty-six pages, and is illustrated by twenty-four plates, one of which is a folio. It has already been printed and copies distributed among working geologists. No copy-right is secured on the publications of the Institution; and it may be mentioned here, as an illustration of the manner in which the knowlege contained in the Smithsonian memoirs reaches the public generally in a popular form, that one of the figures of this paper has already been copied, and some of its materials given in a recent work on geology.

2. Another paper, the printing of which is nearly complete, is on the "Winds of the Northern Hemisphere," by Prof. James H. Coffin, of Lafayette college, Easton, Pennsylvania. It is the same which was mentioned in the Report for 1851. Its publication has been delayed in consequence of the difficulty experienced in finishing the maps and printing the tabular matter, and also on account of additions made to it by the author. It is a very elaborate memoir, of two hundred pages, consisting principally of tabular matter, and illustrated by thirteen maps. The most important results arrived at in this paper are as follows: There exists in the northern hemisphere three great zones of wind extending entirely around the earth, modified and, in some cases, partially interrupted by the configuration and character of the surface. The first of these is the trade-wind, near the equator, blowing, when uninterrupted, from northeast to southwest. This belt is interrupted, however, in the Atlantic ocean, near the coast of Africa, upon the Mediterranean sea, and also in Barbary, by the action of the Great Desert. The second is a belt of westerly wind, nearly two thousand miles in breadth, between latitude 35° and 60° north, and encircling the earth, the westerly direction being clearly defined in the middle of the belt, but gradually disappearing as we approach the limits on either side. North of this, there is another system of winds flowing southwardly from high north latitudes, and gradually inclining towards the west, as it moves into a latitude of greater easterly velocity.

Subsequent investigations have led Prof. Coffin to conclude that the lines which separate these systems are not parallels of latitude, but circles, having a common pole in about latitude 84° north, and longitude 105° west from Greenwich, and that the winds of high northern latitudes diverge or radiate from this point.

The principal cause of these phenomena is the greater heat of the

sun between the tropics, which rarifies the air, and causes it to ascend into the higher regions; producing below a current from the pole towards the equator, and above a current in the opposite direction. The resulting motions to and from the equator are not in a north and south direction along the meridians, but are modified by the rotation of the earth; at the surface they deviate towards the west, and in the return current above towards the east. If the point mentioned by Prof. Coffin as the centre of the winds of the polar zone really exists, it is probably that of maximum cold; the air at this point would be condensed, and flow from it in radial lines in every direction along the surface of the earth. The paper is an important addition to meteorology, and has cost the author years of labor. The publication of it has also been very expensive, particularly on account of the maps and tables.

3. Another memoir accepted for publication is, "An Account of a Tornado that passed near New Harmony, Indiana, April 30, 1852, by John Chappelsmith."

The eastern portion of the North American continent is almost every year visited at different points by one or more tornadoes of frightful energy, but of exceedingly circumscribed limits; and it is almost an opprobrium to the science of this country that more reliable data have not been collected towards settling definitely the conditions of these remarkable phenomena, and for ascertaining their cause. For this purpose, however, mere verbal descriptions of the effects are alone insufficient; there must be added to these accurate instrumental surveys, and, if possible, the indications of the barometer, thermometer, and hygrometer. The first accurate report of this kind was that by Professor A. D. Bache, relative to a tornado which passed over the city of New Brunswick, in New Jersey, in 1834. A similar survey was made by Professor Eustis, of Harvard University, of the tornado of August 21, 1851, which passed near Cambridge.

We consider the present memoir as an exceedingly valuable addition to the stock of our knowledge on this subject. It gives not only all the collateral phenomena as far as they could be obtained, but presents a map of one square mile of the track on which are elaborately plotted the relative position and bearings of the prostrated trees. Some idea may be obtained of the enormous energy of this tornado from the statement of the author, that "on a single square mile of the track thousands of trees, many of them having a stem fifteen feet in circumference, were prostrated by a force acting simultaneously in opposite directions, and moving onward at the rate of a mile in a minute."

The author critically analyses the force at work, and arrives at the conclusion that the proximate cause of the phenomenon is an inward, upward, and onward moving column of air. Besides the map, the memoir is accompanied by diagrams and sketches to illustrate the character and effects of the tornado.

4. Another memoir is entitled "The Antiquities of Wisconsin," examined and surveyed by I. A. Lapham.

In the Report for 1851, it was mentioned that Mr. Lapham, an experienced engineer, had undertaken, under the direction of the American Antiquarian Society of Worcester, Massachusetts, to make explorations,

surveys, and drawings of the aboriginal antiquities of Wisconsin; and, to insure harmony of action in the cultivation of the wide field of research offered by the ancient monuments of this country, that the Antiquarian Society had agreed to present to the Smithsonian Institution the results of the labors of Mr. Lapham for publication, and to reserve its own funds for further explorations. Mr. Lapham's memoir has been completed; and, after having been examined and reported upon by a committee of the Antiquarian Society, has been presented to the Institution for publication. It consists of several hundred pages of manuscript, illustrated by sixty-three large drawings or plates adapted to the size of the Smithsonian contributions, a map of the country, and ninety-seven figures or smaller designs, intended to be engraved on wood and interspersed with the text.

Elaborate works of defence, and such as are apparently designed for religious or sacrificial ceremonies, so numerous in other sections of the country, are seldom found in Wisconsin. In place of these, less elevated structures, though often on a scale of considerable horizontal extent, representing a variety of fanciful forms, abound along the sides of the streams and borders of the lakes. The figures are principally those of lizards, turtles, birds, bears, foxes, and men, and they appear to be confined within a limited territory, between the Mississippi and Lake Michigan. It is very remarkable, says the committee, that none of the earlier travellers appear to have noticed the animal shape of the embankments; but this is accounted for by the extent and flatness of the works, and the difficulty of recognising them while covered with trees or a dense growth of other vegetation. Indeed, the surveyors who first attempted to plot them, were sometimes surprised at the figures developed under their hands, and which could not have been perceived on the ground, unless from an elevated point of view.

The memoir of Mr. Lapham, with a few unimportant exceptions, includes an account of every known work or assemblages of works in this region, and the whole were carefully surveyed by himself or by competent individuals under his direction. On the map are laid down the relative position of the earth-works; and from this it appears that they lie chiefly along the course of streams and the borders of the interior lakes. Nearly the same forms are repeated in different localities, but with dissimilar arrangement, and often with slight, yet evidently intentional, variation in figure. The works are enumerated as follows:

a. Tumuli of a conical shape and slight elevation.

b. Oblong mounds not more than three or four feet high, of regular width, extending in a straight line from twenty feet to several hundred, and even a thousand.

c. Embankments in crescent and serpentine forms.

d. Embankments tapering uniformly in width from one extremity to the other, and terminating in a point.

e. Similar tapering embankments, with two projections on one side, near the larger end, which are called lizards, and are very numerous.

f. The same general form, with projections on both sides at the larger end, and with a similar tapering tail, sometimes of exceedingly dis-

proportionate length. These frequently present a striking resemblance to a turtle, and are known by the name of that animal.

g. Oblong embankments, with arms or wings extended on either side. These vary from simple crosses to figures of birds and men, the head being usually omitted.

h. Representations of animals of more definite outlines and better proportions: among these are bears, foxes, otters, &c., and upon the Wisconsin river, buffaloes. It is proved by numerous excavations that the works which resemble animals are destitute of relics; they are mere relievos or embossments on the surface of the earth, seldom exceeding four feet in height, and in some cases but a few inches. Mr. Lapham disclaims all intention of indulging a disposition to theorize or speculate on the origin or design of these remains, and declares his object to be merely the faithful performance of the office of surveyor, to study the facts, and to report them in as much detail as may be necessary, leaving to others the deductions which, in connexion with other information, may be drawn from them. In the opinion of the commission appointed by the society to examine the memoir, "Mr. Lapham has accomplished his task with great thoroughness and artistic skill; he seems to have explored the entire field, to have industriously delineated every object of interest, and to have omitted no detail of drawing or description which could conduce to a clear understanding of the matter of which he treats." The publication of this memoir, which will be alike creditable to the author, the Antiquarian Society, and this Institution, will furnish an interesting addition to the antiquities of this country, which cannot fail to be hailed with pleasure by the ethnologist.

5. Two botanical papers, furnished by Dr. John Torrey, of the New York Medical College, have been published during the past year. The first describes a new plant, to which the author has given the name of *Darlingtonia Californica*. It is a new pitcher-plant, which was first detected by Mr. W. D. Brackenridge, assistant botanist in the United States Exploring Expedition under Captain Wilkes. It has hitherto been found only near the Shasta mountain, on the Upper Sacramento. The specimens brought home by Mr. Brackenridge were without flowers or seed-vessels, so that the genus of the plant could not be determined, but it was taken for a new Sarracencia. After many years, the flowers were discovered by Dr. G. W. Hulse, and brought to Dr. Torrey, who has shown that the plant is an entirely new genus of the same small but very interesting natural order to which the Sarracencia belongs. He has bestowed upon it the name of Darlingtonia, in honor of Dr. William Darlington, of West Chester, Pennsylvania, author of several valuable botanical works. The genus formerly dedicated to this veteran botanist by De Candolle having been reduced to an older one, Dr. Torrey embraced the opportunity of restoring the name, and connecting it with one of the most remarkable plants of North America.

6. The second memoir by Dr. Torrey is an account of a new maritime shrubby plant, called "Batis Maritima," which grows on the shores of Key West, Jamaica, Cuba, and the neighboring parts of the continent. It has been known to botanists for more than one hundred and fifty years, yet, strange to say, it has not till now been correctly described, nor its place in the natural system determined with any cer-

tainty. Dr. Torrey considers it as the type of a distinct order; nearly allied to the empetraceæ, or crowberries.

Both memoirs are illustrated with plates, from beautiful drawings made by Sprague, at the expense of the institution.

7. The next memoir is a "Synopsis of the Marine Invertebrata of the Grand Manan, or the region about the Bay of Fundy, New Brunswick," by William Stimpson.

The island of Grand Manan, a part of the natural history of which this paper is intended to illustrate, lies at the mouth of the Bay of Fundy, and is surrounded by deep water, the bottom of which abounds in a variety of marine animals.

The memoir consists of a compend of observations made on the marine fauna of this region during a residence of three months in the summer of 1852, and also of a catalogue of the marine invertebrata found on the shores and in the adjacent waters.

Minute surveys of the marine animals of a given district are highly interesting; it is only by a comparison of the results of such examinations made at a series of points along a coast, that an accurate knowledge can be obtained of their distribution, and of the effects of external circumstances on their growth, habits, and economy. By such surveys we can ascertain whether a species may inhabit two distant localities without occurring in the intermediate space, a fact which has an important bearing on several interesting questions relative to geological changes. The author is a pupil of Professor Agassiz, and has been appointed one of the naturalists in the North Pacific Exploring Expedition, under Captain Ringgold.

The paper occupies sixty-six pages, and is illustrated by thirty-seven lithographic figures.

8. A memoir has also been presented, and is now in the press, "On some new American species and localities of Microscopic Organisms," by Prof. J. W. Bailey, of West Point, New York.

Nearly two centuries have passed away since Leeuwenhoek, an eminent physician of Holland, discovered by means of the microscope a department of organized nature, consisting of bodies imperceptible to the unaided vision, and displaying active forms, so strange and varied in their appearance, that they excited a general curiosity. The discovery, in some of them, of organs of motion, convinced him of their animal character, and he gave to them the name of *animalcules*. They were afterwards called infusoria. Many opinions were entertained with regard to their character. Linnæus considered them as lifeless, oily particles, and their movements as altogether passive. We owe, however, to Prof. Ehrenberg, of Berlin, an extended series of observations on this subject, the results of which are, that the infusoria are organized bodies; the greater part, if not all, are animals; they exist in all quarters of the globe, as well on land as at the bottom of the sea, and their silicious and calcareous remains form, in this country, wide-spread fossil strata. At Andover, Massachusetts, there is a bed of these remains of fifteen feet in thickness, and underlying the city of Richmond, Virginia, one of twenty-eight feet. Professor Bailey has distinguished himself by researches in the same line, and has published on this subject a series of papers in Silliman's Journal, and in two

memoirs in the Smithsonian Contributions. In the present memoir he has described new species of diatomaceæ, limnias, auliscus, peridinium, cothurnia, and monactinus; he has given the American localities of Amphitetras antediluviana, and tetragramma, and gives an account of the organic forms found in the Croton water, New York.

One of the species described forms a material resembling white clay, which occurs in a large deposit at Suisun bay, about thirty miles above San Francisco; and should, says Prof. Bailey, this fact meet the eye of any scientific traveller in California, it may induce him to furnish further information concerning the geological relations of this interesting deposit, and to collect a good supply of specimens for a more complete study.

It has been known to the New York microscopists, but not to the public generally, that the Croton water abounds in beautiful microscopic organisms, and particularly in diatomaceæ and desmidieæ. The author found in the sediment collected by means of a filter at the Astor House, more than fifty different species of these organisms. Of these the gallionella crotonensis is in the greatest abundance, and thousands of its fragments must be daily swallowed by those who use the unfiltered water. It is so abundant that Prof. Bailey suggests that it may yet prove of importance as a means of detecting the fraudulent dilution of various substances by this water.

This memoir is illustrated by a number of wood-cuts and thirty-eight elaborately drawn figures on a steel plate beautifully executed by J. E. Gavitt, an amateur naturalist and artist of Albany, New York.

9. During the past year the catalogue of Coleoptera by Frederick Ernst Melsheimer, M. D., mentioned in a previous Report, has been published and distributed. It forms an octavo volume of 174 pages.

At first sight it would appear that the study of insects is the most trivial and furthest removed of that of any part of creation from useful purposes; but independently of the interest which attaches to it as an exposition of animated nature, and an exhibition of organization and life in curiously diversified forms, there is scarcely any branch of natural history more intimately connected with the pursuits of the husbandman, the naval architect, and even those of the artist and the bibliographer, than entomology. It is the duty therefore of this institution to afford every facility for the acquisition of this branch of knowledge, and to increase the number of those who make it their special study.

The coleoptera form one of the largest and most widely distributed class of insects; and on account of their boring habits, some of the species are highly destructive to timber. In order, however, to study them properly, it is necessary that the same species which exist in this country and in Europe may be identified, and that those which are new here may be separately described. The present memoir gives the names of all those which have been described, with references to the works where the descriptions may be found. Dr. Melsheimer has spent several years in the preparation of this work. It was referred for examination to Professor S. S. Haldeman and Dr. J. L. Le Conte, who reported in favor of its publication, and offered to superintend its

printing and to bring it down to 1851. This they have done at the expense of much time and labor, and have thereby added materially to the usefulness of the catalogue.

10. A second edition of the report on recent improvements in the chemical arts has been printed, and in due time an additional volume on this subject will be prepared.

11. The general interest which has been awakened by the recent application of electricity to purposes in the useful arts, and its recognised connexion with many important and mysterious phenomena of nature, led to the conclusion that an account of the recent discoveries in this branch of science would be highly prized by a large class of readers. In accordance with this view, a report by M. Müller, of Berlin, has been translated, and will be published as soon as the funds will allow of the expenditure. Stereotype copies of the original woodcuts have been obtained from the author.

It will be especially interesting to the English reader, because it gives more particularly the researches which have been made in Germany, and which are consequently not readily accessible to the inhabitants of this country and Great Britain.

12. Catalogue of North American reptiles in the museum of the Smithsonian Institution. Part 1.—*Serpents.*—By S. F. Baird & C. Girard, pp. 188.—This work is intended to exhibit the nature and extent of the collection of North American reptiles in the museum of the Smithsonian Institution. According to the statement of Professor Baird, it contains full and original descriptions from authentic specimens of 119 species of serpents, of which sixty have been first described by the authors, and from specimens in the Smithsonian collection. All the well ascertained species of North American serpents are included in this catalogue, which thus serves as a complete manual on the subject. The great work by Dr. Holbrook on the reptiles of North America, published in 1842, enumerates 49 species, as being all that were known to him; a number less than half of those in the possession of the Smithsonian Institution.

The *phenomena of magnetism*, which a few years ago were only recognised as existing in iron, and in a slight degree in a few other metals, are now known to belong to all matter; and with those of electricity, with which they are intimately connected, either in the relation of effect and cause, or the concomitant effects of a more general principle, are probably displayed in every part of the material universe. Recent researches render it probable that the sun and moon exert a magnetic influence upon our earth. Were the study of this mysterious principle immediately connected with none of the physical wants of man, or with the arts of life, it would in itself be an object of high interest; but when we reflect how dependent upon it is the art of navigation, and how extensively it is employed in this country in tracing the divisions and boundaries of land, we are, from utilitarian considerations, induced to give it the most minute and laborious investigation.

It is now known that the magnetic needle is never at rest; that it is the subject of various changes, some depending upon the hour of the

day, others upon the season of the year, others again upon longer periods of time.

It also varies in its direction at different places. Between the Atlantic and Pacific coast, or, for example, between Massachusetts bay and the mouth of the Columbia river, there is a variation of upwards of twenty-four degrees; but this variation is not constant even at the same place, but changes from year to year. With these changes it is necessary that the navigator should be familiar. It therefore becomes a matter of national importance that observations of these phenomena should be made at as many places, and those as widely separated from each other, as possible.

The Smithsonian Institution has endeavored to advance this branch of knowledge, by importing at different times, and at considerable expense, four entire sets of apparatus, besides separate instruments, for determining the direction and intensity of the magnetic force.

These instruments have been lent to observers, and in some cases sold to the government for the use of exploring parties, and have done, or are now doing, good service, in adding to the stock of facts which, by the process of induction, are to yield a knowledge of general laws.

It will be recollected that an appropriation was made at the last session of the Regents for supplying magnetic instruments to the Grinnell Expedition. These were procured from London, were given in charge to Dr. Kane, and, we trust, are at this time revealing to that intrepid explorer the fitful and mysterious changes of the magnetic force.

During the past year, a magnetic observatory has been erected within the grounds of the Smithsonian Institution. It principally consists, to insure an equable temperature, of an under-ground room, enclosed within two walls, between which a current of air is allowed to pass in order to prevent dampness. This observatory has been supplied with a set of apparatus for determining the continued variations in direction and intensity of terrestrial magnetism. By a very ingenious application of the photographic process, the invention of Mr. Brooks, of England, the instruments are made to record, on a sheet of sensitive paper moved by clock-work, their own motions.

First, to determine the variation of direction of the horizontal magnet: a steel bar, strongly magnetized, is suspended by several fibres of untwisted silk, so as to have perfect freedom of motion in the horizontal plane, and from a gas light, kept perpetually burning, a single ray of light is thrown upon a concave mirror permanently attached to the magnetic bar, and consequently partaking of its movements. This ray of light is reflected and brought to a focus at the surface of a revolving cylinder, moved by clock-work, on which the photographic paper is placed. When the magnet is at rest, the pencil of light is stationary, and consequently traces, on the moving paper, a simple straight line; but when the magnet is disturbed by terrestrial perturbations, its oscillations are recorded by the motion of the pencil of light in a curved or zigzag line.

To register the intensity of strength of the magnetic force, another bar magnet is suspended by two parallel silk threads about an inch apart, descending from two hooks fastened to the under side of a plate

attached to the ceiling or some other support. The plate is then made to revolve through an arc of a circle until, by the force of torsion, the bar is deflected from a north and south to an east and west direction. It is thus kept in a state of equilibrium between the force of torsion of the threads, tending to turn its north end round still further to the south, and the magnetism of the earth, on the other hand, tending to bring it back to its north and south direction. If in this position the magnetism of the earth becomes stronger, it will prevail, and the north end of the needle will turn towards the north; if the magnetism of the earth diminishes in intensity, the force of torsion will prevail, and the same end will move towards the south. These motions, as in the case of the other magnet, are recorded by a beam of light on the paper surface of the revolving cylinder.

But besides the change of direction of the horizontal needle, a magnet so supported as to be free to take any position, in this latitude will arrange itself with its north end dipping down towards the horizon. The amount of this dip, or variation, varies also in different places, and at different times; and to record these changes a bar is supported, in the direction of the magnetic north and south, on two knife edges like the beam of a balance. Any change which takes place in the position of a magnet thus arranged, is recorded by a mirror attached to the prolongation of the axis on which the bar turns.

It is proposed to keep these instruments constantly in operation, for the purpose of comparing results with other observations of a similar character in different parts of the world; and also for the purpose of furnishing a standard to which the observations made at various points by the Coast Survey, and the different scientific explorations which are now in progress in the western portions of the United States, may be referred, and with which they may be compared.

This establishment ought to be supported by government; but, as no provision has been made for it, and as the wants are pressing, in order to render more valuable the observations making in other countries as well as our own, the Smithsonian Institution, in connexion with the Coast Survey, has undertaken to commence it. In accordance, however, with the policy which has thus far governed the acts of the Institution, this observatory will be turned over to other hands as soon as other means are found for its support.

The other sets of magnetic instruments mentioned, which have been imported by the Institution, are intended to furnish portable magnetic observatories, in which the dip and the intensity are recorded by the pen from direct and personal observations.

Besides the facts which will be collected by the Coast Survey along our extended seaboard, those which the various exploring expeditions are furnishing, and those obtained by the instruments belonging to the Smithsonian Institution, a large number of records of observations exist as to the position of the magnetic needle in different parts of the United States in past times. A collection of these, and a comparison of them with more recent observations, would serve to throw light on the changes which have taken place in the course of years.

There is, also, on record in the land office, an extended series of

observations which, though not made with great precision, will still be of value in delineating the general direction of the magnetic lines in different parts of the United States. Steps have been taken to collect all the existing materials relative to this subject, with the view of submitting them in due time to reduction and careful investigation.

Correspondence.—There is one part of the Smithsonian operations that attracts no public attention, though it is producing, it is believed, important results in the way of diffusing knowledge, and is attended, perhaps, with more labor than any other part. I allude to the scientific correspondence of the Institution. Scarcely a day passes in which communications are not received from persons in different parts of the country, containing accounts of discoveries, which are referred to the Institution, or asking questions relative to some branch of knowledge. The rule was early adopted to give respectful attention to every letter received, and this has been faithfully adhered to from the beginning up to the present time.

These communications relate to a great variety of subjects. Any topic which strongly excites the attention of the public at a given time, such as the announcement in the papers of a wonderful discovery, or an important invention which promises to introduce extensive changes in the useful arts, is sure to bring upon the Institution an increase of labor in the way of correspondence. The ordinary inquiries addressed to the Secretary relate to the principles of mechanics, electricity, magnetism, meteorology, names of specimens of plants, minerals, insects, and, in short, to all objects or phenomena of a remarkable or unusual character.

Requests are frequently made for lists of apparatus, for information as to the best books for the study of special subjects, hints for the organization of local societies, &c. Applications are also made for information by persons abroad relative to particular subjects respecting this country. When an immediate reply cannot be given to a question, the subject is referred, by letter, to some one of the Smithsonian colaborers, to whose line of duty it pertains, and the answer is transmitted to the inquirer, either under the name of the person who gives the information or under that of the Institution, according to the circumstances of the case.

There is no country on the face of the earth in which knowledge is so generally diffused as in the United States; none in which there is more activity of mind or freedom of thought and discussion, and in which there is less regard to what should be considered as settled and well-established principles. It will not, therefore, be surprising that the Institution should be called upon to answer a great number of communications intended to subvert the present system of science, and to establish new and visionary conceptions in its stead, and that numerous letters should be received pertaining to such subjects as the quadrature of the circle, the trisection of the angle, the invention of self-moving machines, the creation of power, the overthrow of the Newtonian system of gravitation, and the invention of new systems of the universe.

Many of these communications are of such a character that, at first sight, it might seem best to treat them with silent neglect; but the rule

has been adopted to state candidly and respectfully the objections to such propositions, and to endeavor to convince their authors that their ground is untenable.

Though this course is in many cases attended with no beneficial results, still it is the only one which can be adopted with any hope of even partial good. In answering those who persist in declaring that the present received laws of mechanical action are erroneous, and that they have discovered new and more correct generalizations, they are requested to prove the truth of their assertions by predicting new and important phenomena, the existence of which may be immediately tested either by experiment or observation. It is not enough that the new system explains facts which we know, for this would be merely exhibiting old knowledge under a new form, but it should point out in the way of deduction new facts which have hitherto escaped the eye of the observer or the scrutiny of the experimenter.

It is to be regretted that so many minds of power and originality in our country should, from defective scientific training, be suffered to diverge so widely from the narrow path which alone leads to real advance in positive knowledge. Providence, however, seems in some measure to vindicate the equality of its distributions, by assigning to such a double measure of hope and self-esteem, which serves them instead of success and reputation.

The faithful discharge of the duty of the correspondence of the institution imposes a serious labor on the secretary and his assistants. Beside the correspondence above mentioned, there is added to their duties that which relates to the reception and publication of the memoirs; to the lectures; the letters sent forth by the institution respecting particular branches of research; the answers to the almost innumerable inquiries as to the character of the institution, and applications for its publications; all the business matters which relate to the printing, engraving, binding, transportation, payment of accounts; and all the foreign correspondence relating to the exchanges of publications.

All the letters received are bound in volumes, and a copy of every answer is carefully preserved, the whole thus forming a permanent record of all the transactions of the institution, as well as a history of the topics of scientific interest which have particularly occupied the public mind during any given period. The exposition of this labor, which has been increasing from year to year, will be a sufficient answer to the question which is sometimes asked as to what the officers of the institution find to do.

Meteorology.—The general system of meteorology described in the last and previous reports has been continued, and though some changes have taken place among the observers, yet the number and efficiency of the corps have been kept up. New instruments have been gradually introduced, and constant improvement has taken place with the experience of each year in the precision and accuracy of the observations. Since the beginning of the system, a large amount of valuable matter relative to the meteorology of the United States has been collected; and the institution has now commenced to reduce these observations, and to deduce from them the general laws which govern the climate of

this country. It is believed that such results will be obtained as will justify the amount of expenditure of the Smithsonian fund which has been devoted to this purpose.

The reductions which had been made up to the close of the last session of the Regents were presented with the annual report to Congress, and were ordered to be printed. It has been found, however, that the tables cannot be presented in an octavo form, and that a special resolution of the Senate will be required to print them in a quarto volume.

An interesting part of the meteorological observations is now in process of reduction at Greenwich, free of expense to the institution, by Captain Lefroy, late superintendent of the Toronto Observatory. He has undertaken this labor from a love of science, and has received some assistance in the way of clerk hire (as he informs me) from the fund placed in charge of the Royal Society by the British government for the promotion of science. The reduction will include not only all the observations collected by the Smithsonian Institution, but also those which can be obtained from every part of the earth during five years, beginning with 1848.

Among the questions proposed to be answered by Captain Lefroy in discussing the observations, are the following:

1. Does the aurora ever occur in low latitudes when it is wanting in higher ones?
2. Is it developed in continuous zones, or are there wide gaps in these zones; if the latter, have they any connexion with other atmospheric phenomena?
3. What are the ordinary diurnal laws of its development?
4. Can the facts be reconciled with any theory giving it a material objective existence, or is it an optical phenomenon?
5. Can the facts be reconciled with the zodiacal theory?
6. What are its geographical limits; and what causes their singular variation from day to day?
7. Are lines of equal frequency on the globe, or equal intensity, circles at all?

Definite answers to these questions would clear the ground for the establishment of a rational theory as to the cause of this phenomenon, the want of which, after all that has been said and written upon it, is an opprobrium to the science of the present century.

The results of Captain Lefroy's deductions will be presented in the form of a memoir to the Smithsonian Institution.

Propositions have been made during the past year to apply to government for aid in extending the meteorological system, or to transfer it from the Smithsonian Institution to the National Observatory, the Department of the Interior, or to an independent establishment supported by a direct appropriation from Congress.

In answer to these propositions the Secretary, in behalf of the Regents, has stated that it was not in accordance with the policy of the institution to ask the aid of Congress for the purpose of carrying on any of its operations; but that it is consistent with its policy to relinquish any line of research which can be carried on equally well by other means. If, therefore, any of the plans proposed can be accomplished, the institution will cheerfully relinquish this field, and devote

its labors to other objects. The Institution has, however, already expended a large amount of money in collecting meteorological data, and it is due to the memory of the founder that full credit shall be given to his name for all the results which may be produced by the expenditure of the income of his bequest. This is one of the conditions on which the trust was accepted, and in case of any transfer of this kind it should be borne in mind. I may also remark, in the same connexion, that while full credit should be given to the officers and assistants for the faithfulness and efficiency with which they discharge their duties, they should not be allowed to publish, under their own names, results which have been collected and elaborated at the expense and under the direction of the Institution. The establishment of definite rules on this point, though a delicate matter, is one which requires attention.

According to the estimate of Mr. Blodget, who is still employed in reducing and discussing the observations, the whole number of meteorological observers now on the books as regular contributors, or as entitled to exchange for valuable series of observations sent, or for reports regularly made in previous years is (520) five hundred and twenty. The number added during the year 1853 to the list of previous observers, and who have returned observations for some portions of the year, is (119) one hundred and nineteen. The number of manuscript series of observations in detail, or in full summaries of means and extremes of the observed conditions for each month of the whole period observed, received during the year, is (75) seventy-five, covering an aggregate period of temperature observation of eight hundred and fifty years. About half these series also include observations of amount of rain. Of printed and published series a large number have been sent.

Exchanges.—The system of exchanges mentioned in the last and preceding Reports has been continued during the past year with unabated vigor and corresponding useful results. The records for 1853, as will be seen by a reference to Prof. Baird's report, show a large increase, both in transmission and receipts, over 1852. This part of the system of Smithsonian operations has everywhere received the commendation of those who have given it their attention or have participated in its benefits. The Institution is now the principal agent of scientific and literary communication between the old world and the new. Its system of exchange is established on a reliable basis, namely: that of the publications of the Institution itself. So long as the present plan of operations is continued, the Institution will annually distribute its contributions, and will continue to receive in return the publications of all the literary and scientific societies of the world. The importance of such a system, with reference to the scientific character of our country, could scarcely be appreciated by those who are not familiar with the results which flow from an easy and certain intercommunication of this kind. Many of the most important contributions to science made in America have been unheard of in Europe, or have been so little known, or received so little attention, that they have been republished as new discoveries, or claimed as the product of European research. By means of the Smithsonian system of exchange, the American author is enabled to place officially, as it were, a copy of his work in the

hands of all those who are engaged in the same line of research, and to insure due credit to himself from the countenance and support of the Institution.

The packages transmitted during the past year amounted, in the aggregate, to 1,604. They weighed 12,220 pounds, and occupied nearly 400 cubic feet of space.

The receipts of works from abroad, in exchange for those sent out by the Institution, are much greater in value, as well as in number, than those of last year. The whole number of articles received for the library of the Institution during 1853, is 2,556. For other institutions, 1,052 packages have been received. The number of separate works which these contain is unknown.

The Museum.—Additions during the past year have been made to the museum from all branches of natural history and ethnology. They are principally derived from various portions of our own country, particularly from the region between the Mississippi river and the Pacific ocean.

The Institution has taken the temporary charge of most of the collections of the various exploring expeditions which have been sent out during the past year. For a detailed account of the additions, I beg leave to refer to the accompanying report of Prof. Baird.

In accordance with the spirit which should pervade all parts of the Institution, much good may be done in the way of promoting natural history by distributing duplicate specimens among the cabinets of the country and recommending the establishment, by associations of teachers and others, of local collections, and by giving directions for conducting museums of this kind. The Institution, during the past year, has done good service in this way, and will continue and extend this means of diffusing knowledge.

Researches.—Though little has been done immediately by the Institution, since the date of the last report, in the way of original research, yet it has rendered important aid to physical geography and natural history, by the facilities which it has afforded the several exploring parties which have been fitted out during the past year, for railway and boundary surveys, in the regions west of the Mississippi. The instruments have been compared, implements constructed, and practical instruction given in the art of observation and the means of preserving specimens.

The secretary has devoted considerable time, as a member of commissions appointed by government, to scientific investigations. These duties, as well as those above mentioned, are performed entirely without remuneration; and the Institution is thus, in various ways, repaying, to a considerable extent, whatever expenditure the government has made on account of the Smithsonian bequest.

The Library.—The library during the past year has received an addition of 5,433 articles, the most valuable portion of which have been derived from the Smithsonian exchanges. The whole number of books, etc., now in the library is 25,856.

At its last session, Congress appropriated $3,000 to begin the pre-

paration of a catalogue of its library on the Smithsonian plan proposed by Professor Jewett. This work has been successfully prosecuted since July last; and according to Professor Jewett's report, upwards of 6,000 volumes have been catalogued. This plan, the honor of the invention of which the Convention of Librarians has awarded to Professor Jewett, and which has been received with approbation by those well qualified to judge of its merits, is now in a fair way to be reduced to practice. The objects to be gained by adopting it are—

1. To avoid the necessity of preparing, composing, and correcting anew the titles once printed, when the library has received accessions; or the alternative of printing the titles of these accessions in supplements, which are very inconvenient appendages.

2. To prevent the repetition of the work of preparation of titles, composition, and correction of press, for copies of the same book in different libraries. The title once prepared and stereotyped remains at the Smithsonian Institution, to be used by any library having the same book.

3. To secure uniformity in the construction of catalogues, thus greatly facilitating the researches of the student.

For other facts and details, see Professor Jewett's report herewith submitted.

Lectures.—Lectures have been given as usual by a number of distinguished gentlemen on the following subjects:

A course of eight lectures by Dr. Robert Baird on "Modern Europe."

One lecture by Hon. Henry Barnard on "The School."

One lecture by Professor Stephen Alexander, of the College of New Jersey, on "Climate."

One lecture by Job R. Tyson, esq., of Philadelphia, "Patrick Henry."

One lecture by Rev. C. C. Pise, "Charles Carrol, of Carrolton."

One lecture by Dr. E. K. Kane, U. S. N., "On the New Expedition in search of Sir John Franklin."

A course of five lectures by Professor A. Guyot on "The Harmonies of Nature and History."

A course of seven lectures by Dr. J. B. C. Smith, of Boston, on "Modern Egypt and its Institutions."

One lecture by George Sumner, esq., on "France."

Lectures were also delivered during the season, in the Smithsonian lecture room, to the Washington Young Men's Christian Association, Metropolitan Mechanics' Institute, and the Teacher's Association.

We have concluded to adopt the plan of a continued course on a single subject extending through the entire session; and for this purpose Professor J. Lawrence Smith, of the University of Virginia, has been engaged to give a full course on chemistry during the present winter.

Meeting of the Establishment.—The Secretary was directed by the President of the United States to call a meeting of the members and

honorary members of the "Smithsonian Institution," or, in other words, of the body which is generally known by the name of the "Establishment." I may mention that this body consists of the President of the United States, the Vice President, the Chief Justice, the Mayor of Washington, the several officers of the cabinet, (excepting the Secretary of the Interior, this department having been created since the passage of the act establishing the Institution,) the Commissioner of Patents, and such other persons as they may elect *honorary members*. This body met in the Smithsonian building on the 3d of May, 1853, and at a subsequent meeting adopted a set of by-laws, and elected Professor Parker Cleaveland, of Bowdoin College, Maine, an honorary member.

In accordance with the third section of the act of incorporation, a full account of the proceedings of the Establishment will be given in connexion with the report of the proceedings of the Board of Regents.

Respectfully submitted,

JOSEPH HENRY,
Secretary Smithsonian Institution.

JANUARY, 1854.

REPORT OF THE ASSISTANT SECRETARY, IN CHARGE OF THE LIBRARY.

DECEMBER 31, 1853.

SIR: The following table exhibits the additions to the library during the year 1853, distinguishing the receipts by purchase, by donation and exchange, and by copyright:

SOURCES.	Books.	Pamphlets and parts of vols.	Engravings.	Maps.	Music.	Drawings.	Other articles.	Totals.
By purchase	259	1,554						1,813
By donation and exchange	1,244	1,121		88				2,453
By copyright	505	181	14	8	448		11	1,167
	2,008	2,856	14	96	448		11	5,433

The whole number of books, pamphlets, maps, engravings, and other articles at present belonging to the library, is shown by the following table:

SOURCES.	Books.	Pamphlets and parts of vols.	Engravings.	Maps.	Music.	Drawings.	Other articles.	Totals.
By purchase	4,432	2,511	1,335	2				8,280
By donation and exchange	3,901	5,164	58	1,813		30	41	11,007
By copyright	2,809	420	38	59	2,274	9	97	5,706
By deposit	873							873
	12,015	8,095	1,431	1,874	2,274	39	138	25,866

The purchases during the year have been few and unimportant.

The receipts by exchange and donation have been numerous and valuable. A particular account of them is given by Professor Baird in his report upon the exchanges. It is not thought necessary, therefore, to dwell upon them here, further than to state that many of the works thus received are of great value from their intrinsic merit, and from the

difficulty of procuring them through the ordinary channels of the book trade.

It is much to be regretted that no measures have yet been taken for the better regulation of the copyright deposit. I have repeatedly called attention to the subject, and in my last two reports have expressed, at considerable length, views which I hoped might lead to a revision of the law. The interest of this Institution, of publishers, and of the literary public, require further legislation on this subject, and substantially such, it is believed, as was recommended in the reports alluded to.

Much inconvenience has been experienced from the delay in finishing the central building. The books stand in double rows on most of the shelves in the room where they are at present placed. Some of them have been injured, too, by exposure to dampness. It is impossible with the means provided to warm the room, and all who have been engaged in the library have suffered severely from colds contracted while working in it. It has been found necessary to remove many pamphlets and papers to the basement, where they are subject to injury, and where it is difficult to consult them. The labors of the library are doubled by the want of proper accommodations. On these accounts, it is much to be desired that the main library should be finished at as early a day as possible, in order that the books may be removed to a permanent, safe, and convenient lodgment.

Applications have been made to me during the year for the opening of the library in the evening, and some remarks on the subject have appeared in the newspapers. It was impossible to comply with these suggestions without employing an additional attendant. The present attendant is required to be on duty from daylight in the morning till five o'clock in the afternoon. It would be unjust to require services of him in the evening. Besides, no arrangements have been made for lighting the reading-room, nor can they well be made till the building is finished. It has seemed necessary, therefore, to postpone for the present the further consideration of the subject; which I do with the hope that it may hereafter be found practicable to extend the time for consulting the library, if desired by any considerable number of persons.

Another topic connected with the library to which I wish to direct the attention of the Board of Regents, is the framing of a set of by-laws and regulations for the management of the library and the use of the books. I would also suggest the appointment of a standing committee upon the library. Such a committee becomes the more necessary as the library becomes of more importance, both from its extent and the character of its books, and as the time is near at hand for the completion of the building, and the permanent arrangement of the collection.

The reading-room has continued to be a place of great resort for citizens and strangers. The list of periodicals is extensive, and comprises many of the best scientific and literary journals of this country and of Europe.

It is proper for me here to call attention to the desirableness of completing the series of periodicals and of transactions and journals of learned societies. But very few of our sets are complete. Inquiries are daily made for back numbers which are wanting. As it is probable that we have received all, or nearly all, of the earlier publications

of societies which they are able to supply, it seems advisable to furnish our agents in Europe with lists of the volumes which we possess, and authorize them to purchase, as opportunities may occur, the volumes that are wanting.

The "Notices of Public Libraries," prepared with considerable labor, and published three years ago by the Smithsonian Institution, is still almost daily called for, though about 6,000 copies, printed by Congress and by the Institution, have been distributed. Very few copies remain on hand. Since the book was published, a large amount of additional matter has been received. There is a great demand for information of this kind, and it seems desirable to issue a new and enlarged edition of the Notices. It has been impossible for me, during the past year, to gain time for this work from the daily duties of the library, and the unremitted labor which the superintendence of the catalogue system has imposed upon me.

The National Convention of Librarians and Bibliographers, which met in New York in September last, deserves to be particularly noticed in this report, on account of the frequent reference there made to the position and operations of the Smithsonian library, as well as on account of its importance to all libraries, and to the general interests of literature in this country. It was composed of more than eighty delegates, representing forty-seven libraries in all parts of the country, from Maine to California.

It is gratifying to know that the services of the Smithsonian Institution, in the department of bibliography, were fully recognised by this convention in the following resolution, which was unanimously adopted:

"*Resolved*, That the thanks of this convention be presented to the Board of Regents and officers of the Smithsonian Institution for their steady and effective efforts for the increase and diffusion of knowledge among men; and particularly for the measures which they have adopted for the encouragement and promotion of the public libraries of our country; and we have great pleasure in looking to that Institution as the central establishment of the United States for the furtherance of all such objects."

The convention also passed the following resolutions relative to the great central library of reference and research which it has been the intention of Congress to establish at the Smithsonian Institution:

"*Resolved*, That the establishment of a great central library for reference and research, while it is demanded by the condition of the United States as to general civilization and intellectual advancement, is especially interesting to this convention from the bearing it would have upon libraries throughout the country.

"*Resolved*, That we deem such an establishment as being eminently worthy of support from the national treasury; and that in no way can the government better promote the progress of learning through the whole country, than by placing a central national library under the administration of the Smithsonian Institution."

Among the topics which received particular attention at this convention was the preparation of a convenient manual as a guide to the organization of library societies, the collection of libraries, and their proper management. A committee was appointed to digest the plan

of such a work. So impressed were the members of the convention with its importance, that "the business committee were requested to consider the expediency of memorializing Congress to procure the preparation of such a manual through the agency of the Smithsonian Institution."

Every week, and almost every day, applications are made at this Institution, by letter or by visitors, for information which a book of this kind would contain. The answers have to be many times repeated. I have consequently had the intention of preparing such a manual. The collections for the purpose are mostly made. The volume of statistics and descriptions of libraries was an important antecedent. The development of the catalogue system must also precede any systematic and well considered work of the kind. The period has now come for the fulfilment of this design, and I hope to be enabled and to be authorized to devote such time as may be necessary to its execution.

The library interest has become in this country one of rare magnitude and importance. Nothing can be done by the government, by this Institution, or by individuals here, which tends to promote the establishment or the efficiency of libraries, without being noticed and gratefully appreciated by all the intelligent and educated men of all parties and names, in every city and almost every village and hamlet throughout the land. Every city has its library, so has almost every village, and so have a large number of our common schools. Familiar as this fact is to many of us, it presents a new phase of society, and one indicative of mighty influences. The library is the necessary complement of the school. To teach children to read, and then give them nothing to supply the desire awakened, is mockery. It is reading rather than school-training which has produced the general intelligence of the American people. These libraries must be of various grades—the school and social library of popular English books of history, biography, and general literature for reading; the larger collections in cities for more general study and reference; and the great central library for learned investigations. These should all be linked and bound together in one voluntary yet harmonious system. Such is the general wish most emphatically expressed—a wish which the Smithsonian Institution may do much to cherish and to realize.

It now remains for me to speak of the progress which has been made during the year upon the catalogue system.

A new and greatly enlarged and improved edition of the report, containing an account of the system, rules for the preparation of catalogues, and (as examples under the rules) the catalogue of the bibliographical works in the Smithsonian library, has been prepared and stereotyped. An edition of a thousand copies, as far as to the examples, has been printed. The printers have since been employed upon the catalogue of the Library of Congress, and consequently the work upon the report has been suspended. It would require but a few weeks and an inconsiderable additional expenditure of money to complete this work. The calls for it are frequent, and I feel very desirous of being able to answer them at an early day. The book will probably contain about three hundred pages.

At the last session of the Board of Regents, a resolution was passed,

requesting the Secretary of the Institution to call the attention of the joint Library Committee of Congress to the Smithsonian plan of cataloguing, and to the advantages—economical and literary—which would accrue to the Library of Congress and to other libraries, by their adoption of this plan. The committee examined the subject, and recommended to Congress an appropriation of three thousand dollars for commencing a catalogue. The work was begun in July last, and has proceeded most prosperously till the present time. Upwards of six thousand volumes have already been catalogued, and about one-third of the appropriation remains unexpended. The consideration of the magnitude of the enterprise thus commenced, has led to great caution in adopting the rules establishing precedents. A great part of my time has necessarily been given to the work. Less will probably be required for the future.

I have so frequently and at so much length explained the details and the advantages of the system, that it is not necessary for me to dwell upon them at present, except very briefly.

The title of every work and of each distinct edition of every work is stereotyped upon a separate plate. The author's name also stands on a plate by itself. Each plate shows at a glance the heading to which it belongs. It is obvious that these plates may be placed together in alphabetical or other order, as may be desired. They are mounted on blocks for printing, like other stereotype plates.

The great ends to be gained, and which will thus be secured, are:

1. To avoid the necessity of preparing, composing, and correcting anew the titles once printed, when the library has received accessions, or the alternative of printing the titles of these accessions in supplements, which are very inconvenient appendages.

2. To prevent the repetition of the work of preparation of titles, composition and correction of press, for copies of the same book in different libraries. The title, once prepared and stereotyped, remains at the Smithsonian Institution, to be used by any library having the same book.

3. To secure uniformity in the construction of catalogues, thus greatly facilitating the researches of the student.

It is obvious that the cost of the first catalogue will be greater than if it were not stereotyped. The work of preparation will also be more expensive; but the additional cost of the first edition will be more than saved in the first re-printing of the whole catalogue. It will be further understood that the sum paid by the first library is not only for its own benefit, but for that of every other library hereafter adopting the plan, so far as its books are the same. Congress is, therefore, now conferring a great boon upon other libraries, while at the same time it is taking the course the most economical for the procuring of its own catalogue.

It will be remembered that we had two classes of difficulties to meet, the one literary and the other mechanical. The theory of the system had first to be perfected in all its details. The practical application had then to be made. The time and money which have been expended in Europe in discussions connected with the subject of the best methods of cataloguing, indicate the difficulty of the theory. Prac-

tical stereotypers pronounced the scheme impracticable. A new mode of stereotyping, with a new material, had to be introduced, perfected, and applied for the purpose. There is no art so difficult of improvement as that of typography. These statements will indicate the mechanical difficulties which have been overcome.

It is gratifying to be able to state that the new process of stereotyping which we have adopted for this purpose is likely to be introduced into use on a large scale. The benefits which the Institution will thus have conferred upon the most perfect and most important of the arts, apart from the connexion of these improvements with the catalogue system, will not be the least among its achievements, as the efforts by which this end has been attained have not been the least of its labors.

Impressed as I was with the importance of the subject, and confident as I felt of its entire practicability in every particular, I was desirous that it should be fully discussed by librarians and practical bibliographers, as well as by printers, stereotypers, and experts in the typographical art. The convention to which I have alluded afforded a rare opportunity for this examination of our plans, and a fair and intelligent estimate of their value. I introduced the subject and invited discussion. It was manifest that those who were present had come together having formed various opinions as to the practicability of the scheme, though with but one sentiment as to its desirableness. The matter was discussed a whole day with freedom, and with the manifest desire to arrive at a just conclusion. I take great pleasure in quoting the following resolutions, which were unanimously adopted, as embodying the results of the long, careful, and interested examination:

"*Resolved*, That we have considered attentively the plan for constructing catalogues of libraries, and a general catalogue of the public libraries of the United States, by means of separate stereotype titles, originated and prepared by Professor C. C. Jewett, and developed by him while librarian of the Smithsonian Institution. That we regard it as an object of high importance to the interests of our public libraries, and to the promotion of learning, and worthy to share in the funds of the Institution and the zealous exertions of its officers; the more so as it is an enterprise which cannot be successfully prosecuted, except under the guidance, protection, and pecuniary support of this central establishment for the increase and diffusion of knowledge.

"*Resolved*, That we have learned with pleasure that Congress, on the recommendation of the library committee, made an appropriation for the practical testing of the plan in its application to the Library of Congress, and that the work is now in successful progress.

"*Resolved*, That, as practical librarians and bibliographers, we take pride and satisfaction in the fact that a measure of so great literary utility has received the prompt and efficient support of our national legislature; and we would express the earnest hope that this support may be extended to it liberally, till its first great result in the complete stereotyped catalogue of the Library of Congress shall be attained."

We may reasonably congratulate ourselves upon the complete success of these plans up to the present point. They still need the fostering care of this Institution. As soon as the catalogue of the Library of

Congress shall be completed, other institutions, and even individuals, are ready to avail themselves of the scheme for procuring their catalogues. Its general adoption—the crowning point of all our efforts—seems, therefore, as sure as the completion of the first work.

It is manifest that appropriations will every year be necessary from the Smithsonian fund for the procuring of type, apparatus, and fixtures, as well as for filling any intervals that may occur in the continuity of the work. But it seems now quite certain that the system will ere long grow up into a large and self-supporting establishment, regulated by the combined libraries of the country.

Respectfully submitted.

C. C. JEWETT.

To Joseph Henry, LL.D.,
Secretary of the Smithsonian Institution.

REPORT OF THE ASSISTANT SECRETARY IN CHARGE OF PUBLICATIONS, EXCHANGES, AND NATURAL HISTORY.

SIR: I herewith present to you the report of operations for the year 1853, in the departments assigned to my superintendence.

1. PUBLICATIONS.

During the year 1853, a much larger amount of matter has been printed and published by the Smithsonian Institution than in any year since the commencement of its operations. Two volumes of the quarto series have been completed, of which one has been distributed and the other is nearly ready. The following list contains the titles of the papers in these volumes.

List of Memoirs in Vol. V, Smithsonian Contributions.

1. Introduction; pp. 16.
2. A Flora and Fauna within living animals. By Joseph Leidy, M. D.; pp. 68, and ten plates.
3. Memoir on the Extinct Species of American Ox. By Joseph Leidy, M. D.; pp. 20, and five plates.
4. Anatomy of the Nervous System of *Rana Pipiens*. By Jeffries Wyman, M. D.; pp. 52, and two plates.
5. Nereis Boreali-Americana, or Contributions to the History of the Marine Algæ of North America. By William Henry Harvey, M. D., M. R. I. A; Part II, Rhodospermeæ: pp. 262, and twenty-four plates.
6. Plantæ Wrightianæ Texano-Neo-Mexicanæ; Part II, An Account of a collection of Plants, made by Charles Wright, A. M., in Western Texas, New Mexico, and Sonora, in the years 1851 and 1852. By Asa Gray, M. D.; pp. 120, and four plates.

Vol. VI, Smithsonian Contributions.

1. Introduction; pp. 16.
2. Plantæ Frémontianæ, or Description of Plants collected in California by Col. J. C. Frémont. By John Torrey, F. L. S.; pp. 24, and ten plates.
3. Observations on the *Batis Maritima* of Linnæus. By John Torrey, F. L. S.; pp. 8, and one plate.
4. On the *Darlingtonia Californica*, a new Pitcher Plant from Northern California. By John Torrey, F. L. S.; pp. 8, and one plate.
5. Synopsis of the Marine Invertebrata of Grand Manan, or the Region about the Bay of Fundy. By William Stimpson; pp. 68, and three plates.
6. On the Winds of the Northern Hemisphere. By James H. Coffin, Professor of Mathematics and Natural Philosophy, in Lafayette College; pp. 200, and thirteen plates.

7. The Ancient Fauna of Nebraska, or a Description of Remains of Extinct Mammalia and Chelonia, from the Mauvaises Terres of Nebraska. By Joseph Leidy, M. D., Professor of Anatomy in the University of Pennsylvania; pp. 126, and twenty-five plates.
8. Occultations for 1853.

Volume V contains pages	538	plates 45
Volume VI contains pages	476	plates 53
Or an aggregate of quarto publications	1,014	98

Of these volumes, volume V has been distributed. Volume VI has not yet been bound up, but will be delivered and distributed early in 1854.

In addition to the above, several memoirs for the seventh volume are in hand, and the engravings nearly complete; among these are:

Chappellsmith, on the Tornado of Indiana.

Leidy, on the Extinct Sloths of North America.

Bailey, on New Microscopic Forms.

The octavo publications have also been of considerable extent, and are as follows:

Seventh Annual Report of the Board of Regents of the Smithsonian Institution, for 1852; pp. 96.

Report of the Secretary of the Smithsonian Institution, for 1852; pp. 31.

Catalogue of North American Reptiles in the Museum of the Smithsonian Institution. Part 1—Serpents. By S. F. Baird and C. Girard, pp. 188.

Catalogue of the described Coleoptera of the United States. By Frederick Ernst Melsheimer, M. D. Revised by S. S. Haldeman and J. L. Le Conte, pp. 190.

In addition to these a large number of circulars, relating to various subjects, has been printed.

2. Distribution of Publications and Exchanges.

(a.) *Foreign Distributions and Exchanges.*

The records of foreign distributions and exchanges for the year 1853 show a large increase, both in transmissions and receipts, over 1852, thus exhibiting a steady enlargement of the sphere and extent of operations, gratifying to all who are interested in the speedy diffusion of knowledge throughout the world. As in past years, the Smithsonian Institution has been a most important medium of communication between the American scientific societies and their European correspondents.

The names of the institutions making use of the facilities afforded by the Smithsonian Institution, as well as the complete statistics of the whole business, will be found detailed in the accompanying tables.

The packages, amounting in the aggregate to 1,604, bearing 567 addresses, weighing 12,220 pounds, and occupying nearly 400 cubic feet of capacity, all left the Institution in May, and for a large number

of these packages acknowledgments have already been received. The names of institutions receiving the Smithsonian Contributions to Knowledge, 258 in number, will be found in the table. Nearly 400, however, have received publications of some kind from the Institution; the total number of addresses, including those parcels sent by others, being 567, as already stated.

A.—TABLE EXHIBITING THE STATISTICS OF PRINTED MATTER SENT ABROAD IN 1852, BY THE SMITHSONIAN INSTITUTION.

1. *Distributed by Dr. J. G. Flügel, Leipsic.*

COUNTRIES.	Addresses of principal packages.	Addresses enclosed in preceding.	Total.	Number of principal packages.	Packages enclosed from others.	Packages enclosed for others.	Total.	Weight in pounds.	Capacity in cub. ft.	Boxes.	Letters accompanying parcels.
Sweden	7	7		17	20	9					
Norway	4	1		7	12	1					
Iceland	1			2	1						
Denmark	7	4		14	23	5					
Russia	15	6		32	42	7					
Holland	12	3		23	34	4					
Germany	85	58		155	181	63					
Belgium	9	6		18	34	8					
Switzerland	13	5		19	49	6					
Total	153	90	243	287	396	103	786	6,250	200	25	190

2. *Distributed by Hector Bossange, Paris.*

COUNTRIES.	Addresses of principal packages.	Addresses enclosed in preceding.	Total.	Number of principal packages.	Packages enclosed from others.	Packages enclosed for others.	Total.	Weight in pounds.	Capacity in cub. ft.	Boxes.	Letters accompanying parcels.
France	55	26		80	102	29					
Italy	36	13		43	56	15					
Total	91	39	130	123	158	44	325	2,250	72	9	110

3. *Distributed through the Royal Society and the agency of Henry Stevens, London.*

COUNTRIES.	Addresses of principal packages.	Addresses enclosed in preceding.	Total.	Number of principal packages.	Packages enclosed from others.	Packages enclosed for others.	Total.	Weight in pounds.	Capacity in cub. ft.	Boxes.	Letters accompanying packages.
Portugal	1	1		2	6	1					
Spain	4	2		6	9	2					
United Kingdom	99	51		163	150	59					
Australia	1			1	1						
Total	105	54	159	172	166	62	400	2,786	90	7	140

4. *Distributed by others.*

COUNTRIES.	Addresses of principal packages.	Addresses enclosed in preceding.	Total.	Number of principal packages.	Packages enclosed from others.	Packages enclosed for others.	Total.	Weight in pounds.	Capacity in cub. ft.	Boxes.	Letters accompanying packages.
Old world	17			20	30						
South America	16	2		23	18	2					
Total	33	2	35	43	48	2	93	914	30	7	35

5. *General summary.*

AGENTS.	Addresses of principal packages.	Addresses enclosed in preceding.	Total.	Number of principal packages.	Packages enclosed from others.	Packages enclosed for others.	Total.	Weight in pounds.	Capacity in cub. ft.	Boxes.	Letters accompanying packages.
Dr. J. G. Flügel	153	90	243	287	396	103	786	6,250	200	25	190
H. Bossange	91	39	130	123	158	44	325	2,250	72	9	110
H. Stevens	105	54	159	172	166	62	400	2,786	90	7	140
Others	33	2	35	43	48	2	93	914	30	7	35
Total	382	185	567	625	768	211	1,604	12,200	392	48	475

B.—TABLE EXHIBITING THE NUMBER OF PIECES RECEIVED FROM THE DIFFERENT INSTITUTIONS IN THE UNITED STATES FOR DISTRIBUTION ABROAD.

Obtained by the Smithsonian Institution from various sources, but exclusive of its own publications		2,410
Boston Society of Natural History, Boston	54	
American Academy of Arts and Sciences, Boston	112	
American Journal of Science	35	
American Oriental Society, New Haven	33	
Academy of Natural Sciences, Philadelphia	186	
American Philosophical Society, Philadelphia	72	
U. S. Coast Survey	131	
Patent Office	100	
Topographical Bureau	30	
Indian Bureau	168	
Light-House Board	5	
Secretary of the Navy	29	
J. Ross Browne	170	
Miscellaneous institutions and individuals	319	
		1,444
Total received		3,854

Most of the above consisted of single volumes; a number, however, were packages with several enclosures, which would probably bring the number of volumes to 4,000.

APPENDIX C.

List of Foreign Institutions in correspondence with the Smithsonian Institution.

SWEDEN.

Gotcborg.—Kongl. Vetenskaps och Vitterhets Samhillet.
**Lund.*—Kongl. Universitetet.
Observatory.
**Stockholm.*—Kongliga Svenska Vetenskaps Akademien.
Kongl. Landbruks-Akademien.
*Kongl. Vitterhets Historie och Antiquitets Akademien.
*Riksbiblioteket.
Svenska Akademien.
**Upsala.*—Kongliga Vetenskaps Societeten.
*Kongl. Universitet.

Those marked * have received the fifth volume of "Contributions." The others have received separate memoirs and other publications.

NORWAY.

*Bergen.—Bergen's Museum.
*Christiania.—Det Kongelige Norske Universitet.
Observatory.
Physiographiske Forening.
Drontheim.—Det Kongel. Norske Videnskabernes Selskab.

ICELAND.

*Reykjavik.—Islands Stiftisbokasafn.

DENMARK.

*Copenhagen.—Kongelige Nordiske Oldskrift Selskab.
*Det Kongelige Danske Videnskabernes Selskab.
*Kongelige Bibliothek.
Königliches dänische Seecharten Archiv.
Observatory.
Skandinaviske Naturforskeres Forsamling.

RUSSIA.

Dorpat.—Gelehrte Estnische Gesellschaft zu Dorpat.
*Observatoire Impérial.
*Helsingfors.—Societas Scientiarum Fennica.
*Kasan.—University Library.
*Mittau.—Kurländische Gesellschaft für Literatur und Kunst.
*Moscow.—Société Impériale des Naturalistes de Moscou.
Pulkowa.—Observatoire Impérial.
*St. Petersburg.—Académie Impériale des Sciences.
Depot of Naval Charts of Russia.
Geodetic Survey of Russia.
*Imperial Public Library.
*Kais. Russ. Mineralogische Gesellschaft.
*L'Etat Major du Corps des Ingénieurs des Mines de Russie.
*Observatoire Physique Central de Russie.
*Société Impériale d'Archéologie.

HOLLAND.

*Amsterdam.—Académie Royale des Sciences à Amsterdam.
Genootschap Natura Artis Magistra.
Zoological Garden.
*Groningen.—Academia Groningana.
*Haarlem.—Hollandsche Maatschappij der Wetenschappen.
*Hague.—Bibliothèque Royale.
Leyden.—Botanical Society of the Netherlands.
Musée d'Histoire Naturelle.
*University Library.

*Middelburg.—Zeeuwsche Genootschap der Wetenschappen.
*Rotterdam.—Bataafsch Genootschap der proefondervindelijke Wijsbegeerte te Rotterdam.
*Utretcht.—Provinciaal Utrechtsch Genootschap van Kunsten en Wetenschappen.
Zwolle.—(Overyssel.)—Overysselsche Vereeniging tot Ontwikkeling van Provinciale Helvaart.

GERMANY.

*Altenburg.—Naturforschende Gesellschaft.
Altona.—Geodetic Survey of Holstein.
Observatory.
Berlin.—Anstalt des topographischen Bureaus im general Stabe.
Deutsche Geologische Gesellschaft.
*Geographische Gesellschaft.
Gesellschaft für Erdkunde.
*Gesellschaft Naturforschender Freunde.
Gewerbe Institut.
Ingenieur Schule.
*Königliche Bibliothek.
Königliches Landes Œconomie Collegium.
*Königliches Museum.
*Königlich, Preussische Akademie der Wissenschaften zu Berlin.
Observatory.
Wiegman's Archiv für Naturgeschichte.
*Blankenberg.—Naturwissenschaftlicher Verein des Harzes.
*Bonn.—Naturhistorischer Verein des preussischen Rheinlandes und Westphalens.
Observatory.
*University Library.
*Bremen.—Stadt-Bibliothek.
*Breslau.—Kaiserliche Leopoldinisch-Carolinische Akademie der Naturforscher.
*Dantzig.—Naturforschende Gesellschaft.
Darmstadt.—Grossherzogliche Bibliothek.
Deidesheim.—Pollichia Naturwissenschaftlicher Verein der bayerischen Pfalz.
*Dresden.—King of Saxony.
*Königliche Bibliothek.
K. Sammlung für Kunst u. Wissenschaften.
Dusseldorf.—Gesellschaft Naturforschender Freunde Westphalens.
Emden.—Naturforschende Gesellschaft.
Erfurt.—Akademie Gemeinnütziger Wissenschaften.
*Erlangen.—Königliche Universität.
*Frankfurt am Main.—Senckenbergische Naturforschende Gesellschaft.
*Freiberg.—Königlich-Sächsische Bergakademie.
*Freiburg.—University Library.
*Giessen.—University Library.
Görlitz.—Naturforschende Gesellschaft.

Göttingen.—Königliche Gesellschaft der Wissenschaften.
Göttingen.—*Königliche Universität.
Gotha.—Royal Library.
Grätz.—University Library.
Greifswald.—K. P. Staats u. Landwirthschaftl. Akademie Eldena.
*University Library.
Halle.—Deutsche Morgenländische Gesellschaft.
Naturforschende Gesellschaft.
*Naturwissenschaftlicher Verein in Halle.
Thüringisch-sächsischer Verein.
*University Library.
Hamburg.—Commerz Bibliothek.
Museum.
*Naturwissenschaftlicher Verein.
Observatory.
*Stadt-Bibliothek.
**Hannover.*—Königliche Bibliothek.
**Heidelberg.*—Grossnerzoglich-Badische Universität.
**Innsbrück.*—University Library.
*Ferdinandeum.
**Jena.*—Grossherzogl. herzogl. sächs. Gesammt-Universität.
**Karlsruhe.*—Grossherzogliche Hofbibliothek.
**Kiel.*—Academia Christiana Albertina.
**Königsberg.*—Observatory.
University Library.
Kremsmünster.—Observatory.
Leipsic.—Dr. J. G. Flügel.
Fürstlich-Jablonowski'sche Gesellschaft.
*Königlich-Sächsische Gesellschaft der Wissenschaften.
*Stadt-Bibliothek.
University Library.
Mannheim.—Mannheimer Verein für Naturkunde.
**Marburg.*—Gesellschaft zur Beförderung der gesammten Naturwissenschaften.
*University Library.
**Meissen.*—Isis.
Merseburg.—Central Direction für die Provinz Sachsen.
**Munich.*—Königlich Bayerische Akademie der Wissenschaften.
*Königliche Hof und Staats-Bibliothek.
Observatory.
Polytechnic School.
Neu Wied.—Maximilian Prinz von Wied.
**Nürnberg.*—Naturhistorische Gesellschaft.
Olmütz.—University Library.
**Pesth.*—Ungarische Gelehrte Gesellschaft.
*University Library.
**Prag.*—Das Böhmische Museum.
K. K. patriotisch oekonomische Gesellschaft.
*K. K. Universität.
*Königlich-Böhmische Gesellschaft der Wissenschaften.
Regensburg.—K. Baierische Botanische Gesellschaft.

*Rostock.—University Library.
*Stettin.—Entomologischer Verein.
*Stuttgart.—Königliche öffentliche Bibliothek.
Verein für Vaterländische Naturkunde.
Tharand.—Königliche Akademie für Forst u. Landwirthe.
*Tübingen.—Königliche Universität.
*Vienna.—Kaiserliche Akademie der Wissenschaften.
*K. K. Geologische Reichsanstalt.
*K. K. Hofbibliothek.
K. K. Hof-u. Staatsdruckerei.
K. K. Naturalien Kabinet.
*K. K. Orientalische Akademie.
Observatory.
*University Library.
Zoologisch-botanischer Verein.
*Würzburg.—Physikalisch-medicinische Gesellschaft.
*University Library.
Württemberg.—Der Verein für Vaterländische Naturkunde in Württemberg.

SWITZERLAND.

*Basel.—Die Gesellschaft für Vaterländische Alterthümer in Basel.
College of Basel.
*Naturforschende Gesellschaft.
Bern.—College of Bern.
*Allgemeine Schweizerische Gesellschaft für die gesammten Naturwissenschaften.
*Naturforschende Gesellschaft.
*Genève.—Bibliothèque de la ville de Genève.
Observatoire de Genève.
*Société de Physique et d'Histoire Naturelle de Genève.
Lausanne.—Société Vaudoise des Sciences Naturelles.
*Neuchatel.—Société des Sciences Naturelles.
Zürich.—College of Zürich.
*Gesellschaft für vaterländish Alterthümer in Zürich.
*Naturforschende Gesellschaft in Zürich.

BELGIUM.

Antwerp.—Académie d'Archéologie.
Bruges.—Société des Sciences Naturelles.
*Bruxelles.—Académie Royale des Sciences, des Lettres et des Beaux Arts.
Bibliothèque Royale de Belgique.
*Observatoire Royal.
*City Library.
*Gand.—Université de Gand.
*Liege.—Société Royale des Sciences de Liège.
*Louvain.—Université Catholique.
*Mons.—Société des Sciences, des Arts et des Lettres, du Hainaut.

FRANCE.

Angers.—Société d'Agriculture, Sciences et Arts.
Angouléme.—Société d'Agriculture, Arts et Commerce.
Arras.—Société d'Arras.
Bayeux.—Société d'Agriculture, Sciences, Arts et Belles-Lettres
Besançon.—Académie des Sciences, Belles-Lettres et Arts.
**Bordeaux.*—Académie Nationale des Sciences, Belles-Lettres et Arts.
*Société Linnéenne de Bordeaux.
Brest.—Académie Navale.
**Caen.*—Académie des Sciences, Arts et Belles-Lettres.
Société des Antiquaries de Normandie.
Société Linnéenne de Normandie.
**Charente.*—Soc. d'Agriculture, Arts, et Commerce du Dép. de la Charente.
Cherbourg.—Société Académique de Cherbourg.
Société des Sciences Naturelles de Cherbourg.
Clermont-Ferrand.—Académie des Sciences, Belles-Lettres et Arts de Clermont-Ferrand.
Dijon.—Académie des Sciences, Arts et Belles-Lettres de Dijon.
Evreux.—Société Libre d'Agriculture, Sciences, Arts et Belles-Lettres.
Le Mans.—Société d'Agriculture, Science et Arts.
Lille.—Société Nationale des Sciences, de l'Agriculture et des Arts.
**Lyon.*—Société Nationale de l'Agriculture, d'Histoire Naturelle et des Arts Utiles de Lyon.
*Académie des Sciences, Belles-Lettres et Arts de Lyon.
*Société Linnéenne de Lyon.
Marseilles.—Académie des Sciences, Lettres et Arts.
Mende.—Société d'Agriculture, Commerce, Sciences et Arts.
**Metz.*—Académie Nationale de Metz.
Société d'Histoire Naturelle.
**Montpellier.*—Société Archéologique de Montpellier.
Académie des Sciences et Lettres à Montpellier.
**Nimes.*—Académie du Gard.
**Orleans.*—Société des Sciences, Belles-Lettres et Arts d'Orleans.
**Paris.*—Bibliothèque de la Ville de Paris.
*Bibliothèque du Jardin des Plantes.
*Bibliothèque Impériale.
Bureau des Longitudes.
*Dépot des Cartes et Plans.
*Ecole Nationale des Mines.
*Institut de France.
*Institut Historique de France.
*Ministère de la Guerre.
*Ministère de la Marine.
*Ministère de l'Instruction publique et des Cultes.
Observatoire.
*Société des Antiquaires.
*Société Asiatique.
*Société de Géographie.
Société de l'Ecole des Chartes.

Paris.—Société Entomologique.
*Société Ethnologique.
Société Française de Statistique Universelle.
*Société Géologique de France.
Société Impériale d'Horticulture de Paris.
Société Météorologique de France.
Société Nationale des Antiquaries de France.
Société Nationale et Centrale d'Agriculture.
Société Philomatique.
Reims.—Académie de Reims.
**Rouen.*—Académie des Sciences, Belles-Lettres et Arts de Rouen.
Saint-Quentin.—Société des Sciences, Arts, Belles-Lettres, et Agriculture.
**Strasbourg.*—Société des Sciences, Agriculture et Arts, du Bas Rhin.
*Académie des Sciences Naturelles.
Toulon.—Académie Navale.
**Toulouse.*—Académie des Sciences, Inscriptions et Belles-Lettres de Toulouse.
Tours.—Société d'Agriculture, des Sciences, d'Arts, et des Belles-Lettres.
Trevoux.—Société d'Agriculture, Sciences et Arts.
Troyes.—Société d'Agriculture, Sciences, Arts et Belles-Lettres.

ITALY.

**Bologna.*—Accademia delle Scienze dell' Istituto di Bologna.
Brescia.—Ateneo di Brescia.
Catania.—Accademia Gioenia di Scienze Naturali.
Chamberry.—Société Royale Académique de Savoie.
Florence.—Accademia del Cimento.
*Biblioteca Magliabecchiana.
Imperiale e Reale Museo di Fisica e Storia naturale di Firenze.
Observatory.
Genoa.—Accademia delle Scienze, Lettere, ed Arti.
Accademia Medico-chirurgica di Genova.
**Lucca.*—Reale Accademia Lucchese di Scienze, Lettere ed Arti.
**Milan.*—Biblioteca Brera.
*Imperiale Regio Istituto Lombardo di Scienze, Lettere ed Arti.
*Museo Civico.
Modena.—Observatory.
Società Italiana delle Scienze.
Naples.—Accademia degli Aspiranti Naturalisti.
Observatory.
*Reale Accademia delle Scienze, e Belle Lettere.
**Palermo.*—Accademia Palermitana di Scienze e Lettere.
Observatory.
**Padua.*—Imperiale Regia Accademia di Scienze, Lettere ed Arti di Padova.
Pisa.—Accademia Valdarnese del Poggio.

*Pisa.—University Library.
*Ravenna.—Società Ravennate.
*Rome.—Accademia Romana di Archeologia.
*Accademia Pontifica dei Nuovi Lincei.
*Biblioteca Vaticana.
British Academy of Fine Arts.
Correspondenza Scientifica in Roma.
Osservatorio Astronomico del Collegio Romano.
*Siena.—Accademia delle Scienze.
*Turin.—Accademia Reale delle Scienze.
*Venice.—Biblioteca Marciana.
I. R. Istuto Veneto di Scienze, Lettere ed Arti.
Naval School.
*Verona.—Accademia d'Agricoltura, Commercio ed Arti di Verona.

PORTUGAL.

*Lisbon.—Academia Real dos Sciencias.

SPAIN.

*Madrid.—Real Academia Española.
*Real Academia de Ciencias de Madrid.
*Real Academia de la Historia.
*Biblioteca Real.

GREAT BRITAIN AND IRELAND.

Bath.—Bath and West of England Agricultural Society.
Belfast.—Belfast Institution.
*Library of Queen's College.
*Natural History and Philosophical Society.
Berwick-on-Tweed.—Berwickshire Naturalists' Club.
*Cambridge.—Cambridge Philosophical Society.
*Cambridge Observatory.
*University Library.
*Cork.—Library of Queen's College.
Royal Cork Institution.
Dublin.—Botanical Society.
Dublin University Philosophical Society.
Geological Society of Dublin.
*Library of Trinity College.
*Royal Dublin Society.
Royal Irish Academy.
Edinburgh.—Botanical Society.
*Library of Faculty of Advocates.
Royal Institution for Encouragement of Fine Arts in Scotland.
*Royal Observatory.
Royal Physical Society of Edinburgh.
*Royal Scottish Society of Arts.

*Edinburgh.—Royal Society.
*Society of Antiquaries of Scotland
*University Library.
*Wernerian Society of Natural History.
*Galway.—Library of Queen's College.
Glasgow.—Andersonian Institute.
*University Library.
*Greenwich.—Royal observatory.
*Leeds.—Leeds Philosophical and Literary Society.
*Liverpool.—Free Public Library, Museum, and Gallery of Art, of the Town of Liverpool.
Historic Society of Lancashire and Cheshire.
Observatory.
Royal Institution.
London.—Aborigines Protection Society.
Annals and Magazine of Natural History.
*Archæological Institute of Great Britain and Ireland.
*Athenæum Club.
*Board of Admiralty.
*British Archæological Association.
*British Association for the advancement of Science.
*British Museum.
*Chemical Society of London.
Department of Practical Art.
Entomological Society.
*Ethnological Society of London.
*Geological Society of London.
*Horticultural Society of London.
Institute of Actuaries.
*Institution of Civil Engineers.
*Library of Corporation of City of London.
*Library of Committee of Privy Council for Trade.
*Library of Eaton College.
*Library of the Hon. the East India Company.
*Library of the House of Commons.
*Linnæan Society.
*London Institution (Finsbury.)
*London Library.
Meteorological Society.
*Microscopical Society.
*Museum of Practical Geology.
*Philological Society.
*Queen's Library.
*Royal Agricultural Society of England.
*Royal Asiatic Society.
Royal Astronomical Society.
*Royal College of Surgeons of England.
*Royal Geographical Society of London.
*Royal Institution of Great Britain.
Royal Society of Literature.
*Royal Society of London.

London.—*Society of Antiquaries of London.
*Society of Arts, Manufactures, and Commerce.
*Statistical Society of London.
Syro-Egyptian Society.
*Zoological Society of London.
**Manchester.*—Manchester Free Library and Museum.
*Literary and Philosophical Society of Manchester.
Maynooth.—College Library.
Newcastle-upon-Tyne.—Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne.
Oxford.—Ashmolean Society.
*Bodleian Library.
*Radcliffe Observatory.
Penzance.—Royal Cornwall Polytechnic Society.
*Royal Geological Society of Cornwall.
Salford.—Salford Borough Royal Museum and Library.
**St. Andrews.*—University Library.
**Woolwich.*—Military Academy.

GREECE.

**Athens.*—University Library.

TURKEY.

Constantinople.—Société Orientale de Constantinople.
*Library of the Sultan.

AFRICA.

**Grand Cairo.*—The Egyptian Society.
**Liberia.*—Government Library.
Mauritius.—Société d'Histoire Naturelle de l'Isle Maurice.

ASIA.

**Allahabad.*—Mission College.
**Batavia.*—Bataviaasche Genootschap van Konsten en Wetenschappen,
**Bombay.*—Royal Asiatic Society.
*Geographical Society.
**Calcutta.*—Asiatic Society.
Agricultural and Horticultural Society of India.
**Ceylon.*—Asiatic Sociaty.
Batticotta Seminary.
**Hong Kong.*—Asiatic Society of China.
**Madras* —Literary Society.
**Manilla.*—Royal Economical Society of the Phillipine Islands.

VAN DIEMEN'S LAND.

Launceton.—Launceton Library.
Hobarton.—Royal Society of Van Diemen's Land.

*Bogota.—Sociedad Economica de Amigos del Pais.
*Brazil.—Rio Janeiro.—Imperial Brazilian Historical Society.
Royal Geological Society.
Sociedad auxiliadora de Industria Nacional.
*Caracas.—Sociedad Economica de Amigos del Pais.
*Chili.—Santiago.—Biblioteca Nacional.
Observatory of Santiago.
*University Library.
Demerara.—Queen's College.
*Guatemala.—Sociedad Economica de Amigos del Pais.
*Habana.—Real Sociedad Economica.
Mexico.—Mexico.—El Minerea.
El Museo Nacional.
Navy and War Tribunal.
*Sociedad Mexicana de Geografia y Estadistica.
Pueblo.—Colegio Palafoxano y de Pantaleon.
Vera Cruz.—Public Institute.

The receipts of works from abroad, in exchange for those sent out by the Smithsonian Institution, are much greater than those of last year. Many of these were of very great value, comprising a large number of more or less complete series of transactions and periodicals. For an enumeration of these, I would refer to the Report of the Assistant Secretary in charge of the Library.

D.—Table exhibiting the number of pieces received in exchange from abroad, in 1853.

Volumes.—Folio and quarto	511	
Octavo	929	
		1,440
Parts of volumes and Pamphlets.—Quarto	303	
Octavo	688	
		991
Maps and Engravings		125
Total		2,556

E.—Table exhibiting the number of packages received for other American institutions, &c., in 1853.

Bowdoin College	6
Boston.—American Academy	26
Natural History Society	6
Bowditch Library	7
Cambridge.—Observatory	11
Botanic Garden	7
Harvard College	13
Astronomical Journal	9
Amherst.—Amherst College	8

Worcester.—Antiquarian Society	1
New Haven.—Journal of Science	14
American Oriental Society	7
Albany.—New York State Library	6
New York.—Lyceum of Natural History	13
Ethnological Society	3
Geographical Society	4
Philadelphia.—American Philosophical Society	39
Academy of Natural Sciences	25
Franklin Institute	2
Geological Survey of Pennsylvania	4
Washington.—National Observatory	28
Coast Survey	22
National Institute	6
Surgeon General	1
American Association	2
Congress Library	8
Astronomical Expedition to Chili	4
United States Patent Office	3
State Department	2
Georgetown.—Observatory	10
Miscellaneous, including libraries of States, minor institutions, &c.	755
	1,052

6. Domestic Exchanges.

The copies of Volume V of Smithsonian Contributions to Knowledge intended for American institutions, were all sent off in May at the same time with those for foreign bodies. As heretofore, they were distributed through the following agents, who have made no charge for their service: Messrs. J. P. Jewett & Co., Boston; George P. Putman & Co., New York; Lippincott, Grambo & Co., Philadelphia; John Russell, Charleston; B. M. Norman, New Orleans; Dr. Geo. Engelmann, St. Louis; H. W. Derby, Cincinnati; and Jewett, Proctor & Worthington, Cleveland. Acknowledgments for nearly all have been already received.

NATURAL HISTORY.

INCREASE OF THE MUSEUM.

The additions to the museum during the year 1853 have been very extensive, covering the entire field of natural history and ethnology. Many of these consist of species altogether new to science; while others, though previously described, belong to forms of great rarity. The contributions to our knowledge of the geographical distribution of species have been of the most important character, the localities occurring as they do over the entire area of this country. A very large proportion

of these localities are in the region between the Mississippi and the Pacific, many of them never before represented in natural history cabinets. This condition of things has been, in great measure, due to the labors of the various government parties organized for the survey of the boundary line between the United States and Mexico, and of the several routes for a Pacific railroad. Without a single exception, all these parties have been fitted out at the Smithsonian Institution with all necessary instruments and apparatus for natural history research, much of it contrived with special reference to the exigencies of the particular service involved. Full instructions were also supplied, by which persons without previous practice were enabled to master all the general principles required for making observations and collections of every kind.

In addition to the above official explorations, many of a more private character, and of greater or less extent, have been made by different persons, and transmitted to the Institution. The general result is to be seen in the large number of jars, kegs, boxes, and shelves filled with specimens of all kinds. From this it will be seen that the army has contributed a very large proportion of the whole receipts, affording a gratifying proof of the interest felt in the deposit at the metropolis of complete collections of the natural history of North America.

Owing to the liberality of the officers of the various expeditions, and of the bureaus under whose charge they were fitted out, every facility was afforded in authorizing the necessary force and funds to meet the wants of science as connected with these explorations. In this way the entire cost was defrayed by government; so that the institution has been called upon only to make the necessary expenditures for government, and to give a general supervision to the whole.

Nor have the materials collected by the government parties been allowed to lie idle; on the contrary, they have been put, immediately on their arrival, into the hands of competent naturalists and skilful artists, for the elucidation and illustration necessary to fit them for appearing as a portion of the reports which the various parties have been called on to make.

I shall now proceed briefly to mention the general character of the additions to the museum during the year, referring for particular information to the alphabetical list of donors subjoined. It is impossible at the present time to give an accurate enumeration of all the species received, especially as so many are entirely new. Every specimen, however, is labelled, as soon as it arrives, with the name of the donor and locality; and in the descriptive catalogues, now in course of preparation, the complete account of the whole will be presented in a systematic form. The general history of the explorations, too, will be found to embrace more detail than can here be given.

Mammals.—During the past year many species of North American mammals have been received, embracing quite a notable proportion of the smaller forms from North America, especially the squirrels, spermophiles, and weasels. The Louisiana species have been received from Mr. Fairie; those of Wisconsin, from Dr. Hoy; of the Rocky mountain range, from the expedition of Governor Stevens; of the lower

Rio Grande, from Major Emory. Dr. O. W. Gibbs presented a musk deer from Java, and Mr. Steenburg has contributed many of the species from Greenland and Scandinavia. The collections of Captain Van Vliet and Lieutenant Couch include many species from Mexico and Texas. Some valuable specimens from Minnesota were received from Mr. Cavileer and Dr. Head.

Birds.—The additions to this department have been very great, amounting to over 400 species and more than 1,000 specimens. Of these, 250 species are from the Rio Grande country, North Mexico, the Rocky mountains, and west of the Rocky mountains. Here, as well as among mammals, there have occurred some new species. Of remarkable perfection of preparation was a collection of fifty species of California birds, presented by Dr. Hermann; and the North Mexican series of Lieutenant Couch have been of extraordinary magnitude and importance. Captain Van Vliet, Mr. J. H. Clark, and Mr. Arthur Schott, under Major Emory, and Dr. Crawford, have gathered many valuable specimens in Texas. Species from Michigan have been received from the Rev. Charles Fox; of Wisconsin, from Dr. Hoy and Mr. Barry; of Ohio, from Dr. Kirtland and Charles Pease; of Louisiana, from Mr. James Fairie.

Reptiles and Fishes.—As heretofore, owing to the particular attention invited to this department, the additions to the alcoholic collections have been most marked, especially of reptiles and fishes. Every portion of the country has been laid under contribution, and the additions to our knowledge of the distribution of species, as well as of their zoological character, have been of the greatest value. There is scarcely a State or Territory in the Union which has not sent a representation. The most marked results have been the addition to the fauna of the United States of the dipsadians among serpents, and the characini, ants, the fresh-water labroids among fishes. Nearly two thousand glass jars have been filled with the specimens received, after being assorted, of which two hundred were of serpents alone. The principal contributors have been Major Emory, Governor Stevens, Lieutenant Whipple, Dr. Hammond, Dr. Jeffrey, Professor Winchell, Drs. G. C. and B F. Shumard, Dr. Hoy, Rev. A. C. Barry, Dr. Barratt, Mrs. Daniel, Major Rich, Captain Van Vliet, James Fairie, S. F. Baird, Major Hagner, Major Sibley, Rev. Charles Fox, Dr. Head, J. D. Sergeant, Mr. Kennicott, Mr. Dean, Captain Atwood, Leo Lesquereaux, J. H. Richard, Professor Agassiz, Captain Farragut, D. B. Boden, &c.

Invertebrata.—Many valuable collections of invertebrata have been added during the year, the most important being a series from Grand Manan, from Mr. William Stimpson, and illustrating his paper published in the Smithsonian Contributions to Knowledge. Others from the coast of Massachusetts were sent by Captain Atwood, and from Florida and the Gulf of Mexico, by Dr. Hammond, Dr. Jeffrey, and Major Emory. Some interesting contributions have consisted of specimens of *Gordius* from the bodies of crickets and grasshoppers, contributed hy Mr. Sanford and Mr. Eveleth.

Plants.—An extensive collection of plants of Alabama was received from Prof. A. Winchell, to whom the Institution is indebted for valuable specimens in all departments of natural history. Dr. Ravenel has

presented a suite of the Carolina fungi. Lieut. Whipple and Governor Stevens have sent in important collections from their fields of labor.

Minerals and Fossils.—In connexion with the survey of Gov. Stevens, Dr. Evans revisited the Mauvaises Terres last summer, and collected a large number of specimens of the fossil vertebrata of that region. These have been put into the hands of Dr. Leidy, who has detected the presence of some additional new species. Professor Winchell has sent quite a full series of the cretaceous and tertiary fossils of Alabama, and Major Emory the same from Texas. Many minerals have been received from Dr. Pendleton, of Georgia, and some Austrian stalactites from Mr. Dodge.

Ethnology.—Skulls of many tribes of Indians—as Lipans, Comanches, Apaches, Flat Heads—have been received from various sources; as also remains of works of art. An interesting contribution to this department is found in a specimen of the sculpture of the human foot in limestone by the early inhabitants of the country, and erroneously supposed to be an impression made while the stone was in a plastic state.

PRESENT CONDITION OF THE MUSEUM.

The collections belonging to or deposited with the Smithsonian Institution are at present scattered over the building in its various rooms. Much inconvenience is felt from the impracticability of arranging the specimens properly for examination and study. Everything is kept packed away in the smallest compass, and of course not easily referred to when needed for investigation. The alcoholic collections, however, have generally been accessible when required for use. When the new museum room is finished, which will be in the course of a few months, ample space will be afforded for the accommodation of all the specimens, although a considerable time must necessarily elapse before the cases can be put up and the collections properly arranged.

At the present time the Institution may be said to possess one of the best general collections of specimens of North American natural history in the country, although in particular branches it may be greatly exceeded by several, both public and private. It is pre-eminently rich in the mammals, with their skulls and skeletons; and still more in the reptiles. As an illustration of this, it may be stated that the species of North American serpents alone amount to 130, of which 70 were never described before being received by the Institution. The enumeration by Dr. Holbrook of North American serpents, in 1842, consisted of 49. The other departments of reptiles have experienced nearly proportional increase. The collection of birds is second only to that of the Philadelphia Academy of Natural Sciences; of fishes, only equalled by the private cabinet of Professor Agassiz; while in the various departments of invertebrata and of plants it holds much more than average rank. In fossil remains the collection is very rich, especially of the comparatively recent vertebrata of the various caverns throughout the country.

And, in connexion with this extent and importance of the Smithsonian museum, it may be well to call attention to the fact that it has

been the work of but three years to raise this collection from nothing to the front rank among American cabinets, exceeding all perhaps in the number of new species first brought to light within its limits. Nor has effort been confined merely to the acquisition of specimens, but to their concentration in mass, so as to supply all working naturalists with the materials of research. As already stated, applications for such assistance are constantly being received, and always met with all possible promptness; so that scarcely any natural history monograph or memoir of any extent has been published in this country within a year or two which has not been indebted in this way to the Institution. From the care, too, taken to keep separate all the localities, however near together, of any species, the collection affords information in reference to the geographical distribution of species of the very highest value.

WORK DONE IN NATURAL HISTORY.

The labor of unpacking and assorting collections as received, and labelling and recording the different specimens, has of course been very great, requiring much more time than the limited portion left after discharging the other duties assigned to me. In this, however, I have been assisted very greatly by Mr. Charles Girard, who has given much time and attention to this department, without any compensation for his services. By his help I have been enabled to keep up with the details of labor necessary to give these collections their proper scientific value.

Much has been done during the year towards distributing duplicate specimens of the Smithsonian collection among the other cabinets of the country. In no way can the Institution be of more use in elevating the standard of natural science than in distributing carefully-labelled suites of specimens to points where, from lack of libraries or other causes, the means of accurate identification are wanting. For remote regions of country this mode of assistance is of especial benefit; and arrangements have already been entered into, in several cases, to receive miscellaneous collections, and to return them properly labelled, with the addition of such other species as can conveniently be spared. Parties already in such connexion with the Smithsonian Institution, or about entering upon it, are found in New York, Ohio, Michigan, Wisconsin, Iowa, Illinois, Missouri, New Orleans, and North and South Carolina.

A collection of duplicates of North American serpents and Astaci has been presented to the Philadelphia Academy of Natural Sciences, including types of many new species published by the Institution. To the New York State Cabinet of Natural History was also sent a large collection of reptiles and fishes of New York, embracing many species not previously received there.

The cataloguing of the collections of the Institution progresses as rapidly as my other duties will allow. One way in which a museum may be very useful to those unable to visit it personally, is by publishing catalogues of the specimens contained therein. If these exhibit original descriptions of the species, and especially if the list be made complete by enumerating also the species not contained in the collection, they become of great value to investigators, and may readily serve as

manuals of science, attaining the rank of monographs. This has been done in the Catalogue of North American Serpents in the Museum of the Smithnian Institution, published in January, 1853, which, in a compact volume of one hundred and eighty-eight pages, contains full and original descriptions of one hundred and nineteen species—all belonging to the Institution, with the exception of five ; and some of these, with many additional ones, have been received since that time. Similar catalogues of the other reptiles are in an advanced stage of progression, and will be ready for publication early in 1854.

In addituon to the preparation of these catalogues, much has been done in the classification and description of the collections sent in by the various exploring expeditions. Considerable progress has been made towards the preparation of the several reports of the natural history of the United States and Mexican Boundary Survey, the survey of the North Pacific railroad route by Gov. Stevens, that of the Central route by Lieut. Whipple, that of the United States Astronomical Expedition to Chili by Lieut. Gillis, and several others. The preparation of many hundred sheets of drawings of new species for these reports has been carefully superintended. The reports prepared upon the natural history of the explorations by Capt. Sitgreaves and Capt. Marcy, have already been published by Congress. Some of these I now lay before you.

A large amount of valuable information relating to the descriptions, and the habits and manners of species, has been received during the year—much of it bearing directly upon important questions in science and rural economy. A very extensive correspondence has been required for the purpose of stimulating investigations and calling attention to the solution of particular problems. It is much to be regretted that the Institution has no medium of its own through which the information thus received can be promptly presented to the world. A monthly bulletin, of considerable size, could readily be filled with communications of this kind, as well as with brief notices and descriptions of collections received.

REGISTERS OF PERIODICAL PHENOMENA.

The blank registers of periodical phenomena issued in the winter of 1852–'3, have been returned filled, and in connexion with those for the previous year, still in manuscript, form a body of information of the highest value. These will be carefully reduced, and published at an early period. A new edition having become necessary, a revision of the old lists of plants was carefully made by Drs. Torrey and Gray, and the revised form will be distributed in a few weeks. Instructions for making collections of microscopical organisms and infusoria have been added.

ASSISTANCE IN THE MUSEUM.

As the time has already arrived when more attention and labor should be given to the collections of the museum to make them fulfil all the purposes of instruction of which they are capable, it is very

desirable that the museum force should be increased. I have already adverted to the labor necessarily expended during the past year in merely unpacking and arranging the collections of new matter received. While the old specimens need a certain amount of care, new ones are being constantly added. I would, therefore, recommend that Mr. Girard be regularly employed by the Institution, at such salary as you may think suitable; and one other person in addition, to attend to the purely mechanical work required in the way of unpacking, washing bottles, tying on labels, cleaning specimens, &c. Such service as this could be obtained for about twenty-five dollars per month; and the help of both persons would be also available in other departments where it is imperatively required. This is especially the case in respect to the publications, exchanges, and transportation, where, as in the museum operations, I have no regular assistance whatever.

ALPHABETICAL LIST OF DONORS TO THE MUSEUM OF THE SMITHSONIAN INSTITUTION.

Academy of Natural Sciences.—Skins of North American birds.

Prof. C. B. Adams.—Shells, &c., from Bermuda and St. Thomas.

Prof. L. Agassiz.—*Etheostoma* from Alabama and Missouri.

Capt. Atwood.—Fishes, crustacea, and radiata, from Provincetown, Mass.

Prof. A. D. Bache.—Surterbrand from Iceland.

Prof. S. F. Baird.—Twelve kegs, &c., of fishes, from Wisconsin, Michigan, Ohio, New York, and Canada.

Dr. J. B. Barratt.—Reptiles and fishes from South Carolina.

Dr. J. M. Bigelow.—Seeds from Texas and New Mexico.

Capt. Daniel Boden.—Specimens of lake trout and perch from Otsego lake, New York.

J. S. Bowman.—Reptiles and fishes from the vicinity of Fort Kearney.

Major J. H. Carleton, U. S. A.—Specimen of *theliphonus* from Santa Fé.

Charles Cavileer.—Mammals, &c., from Minnesota.

Robert Clarke.—Skulls of mammals and reptiles, in alcohol, from Essex county, N. J.

Prof. George H. Cook.—Living specimens of *Emys muhlenbergii* from New York.

Dr. G. E. Cooper, U. S. A.—Skulls of Comanche and Lipan Indians.

Dr. J. G. Cooper.—Reptiles from California; skin of *Gymnotus electricus.*

Lt. D. N. Couch, U. S. A.—Very extensive collections of the vertebrata, with numerous insects and specimens of antiquities from northern Mexico.

G. S. Cutting.—*Storeria dekayii* and *Chlorosoma vernalis*, from Middleboro', Mass.

Mrs. M. E. Daniel.—Reptiles from Anderson, S. C.

E. A. Dayton.—Skulls of beaver and fishes, (*Mustela canadensis;*) reptiles and fishes from the St. Lawrence river.

G. W. Dean.—Reptiles from Galveston, Texas.

Delaware County Institute, Pa.—Keg of fishes and reptiles; three hundred and eleven species of plants from Delaware county, Pa.

J. M. Dodge.—Stalactites from the cave of Adelsburg, Austria.

Rev. D. W. Eakins—Limestone slab, with sculpture of human feet, from Verdigris river, Creek Nation.

Dr. George Engelmann.—Reptiles and fishes from St. Louis.

Samuel A. Eveleth.—*Gordius* taken from a cricket.

Jas. Fairie.—Shells of *Chelonura temminckii* from Louisiana; Indian implements, reptiles, &c.

Capt. D. Farragut, U. S. N.—Fishes from Chesapeake bay.

Dr. E. Foreman.—*Unio hopetonensis* from Atlamaha river.

Rev. Charles Fox.—Living specimens of *Eutænia;* fishes, reptiles, and mammals, from Michigan.

Dr. Julius Froebel.—Fossils from New Mexico.

Dr. Wolcott Gibbs.—Musk deer of Java, in the flesh.

B. R. Gifford.—Clays and concretions from Gay Head Bluffs, Martha's Vineyard.

Major Hagner, U. S. A.—*Siredon lichenoides* from Fort Defiance, Navajo country.

C. F. Hammond.—Phosphate of lime from Crown Point, N. Y.

Dr. J. F. Hammond.—Skin of *Crotalus adamanteus*, with fishes and reptiles, in alcohol, from Pensacola.

Dr. W. Hammond.—Skeletons and skulls from Fort Kearney.

Dr. J. F. Head.—Reptiles, fishes, and skulls of vertebrata, from Fort Ripley.

Dr. A. L. Hermann.—Skins of fifty species of birds from California.

Dr. P. R. Hoy.—Fishes, reptiles, birds, and mammals, from Wisconsin.

Dr. R. W. Jeffrey.—Fishes and reptiles from Pensacola.

S. K. Jennings, jr.—Shed skin of *Masticophis flavigularis*, Texas.

Robert W. Kennicott.—Fishes and reptiles from Cook county, Illinois.

J. A. Lapham.—Shells from Wisconsin.

Leo Lesquereaux.—Reptiles and fishes from Ohio.

Rev. Charles Mann.—Salamanders from Gloucester, Virginia.

Dr. Morrow.—Gold ore from Dorn's mine, Abbeville, South Carolina.

Richard Nettle.—Fishes from the lower St. Lawrence.

Dr. E. C. Pendleton.—Minerals and shells from Georgia.

H. W. Ravenel.—Specimens of Carolina fungi.

W. H. Ravenel.—*Sceloporus undulatus*, South Carolina.

Major Wm. Rich.—Reptiles, fishes, &c., from the city of Mexico.

J. H. Richard.—Fishes from Pennsylvania.

E. S. Robinson.—Skin of *Crotalus adamanteus.*

Mr. Sabine.—Reptiles from California; skin of *Gymnotus electricus.*

S. N. Sanford.—*Gordius* taken from the body of a cricket.

Sir Robert Schomburgk.—Tertiary shells and ancient pottery from St. Domingo.

J. D. Sergeant.—Reptiles from Rock Island, Illinois.

Major E. S. Sibley, U. S. A.—Reptiles and insects from Fort Union, New Mexico.

Capt. Shiras, U. S. A.—Specimen of *mygale*, Texas.

Dr. B. F. Shumard.—Specimens of *amblyopsis*, *astacus*, and insects and reptiles, from the Mammoth Cave, Kentucky, and vicinity; fishes from Louisville, Kentucky; reptiles from Mississippi.

Dr. G. C. Shumard.—Reptiles and fishes from the Arkansas river.

Geo. Smith.—Living specimens of *Emys muhlenbergii*, from Delaware county, Pennsylvania.

Commodore Joseph Smith.—Specimens of woods used in ship-building; illustrations of growth and ravages of *teredo*. Prepared by Mr. Jarvis, inspector of Portsmouth yard.

J. M. Stanly.—Dress and war-club of Blackfoot chief.

Judge Augustus Steele.—Fishes, crustacea, and shells, from Atseena, Florida.

Schach Steenberg.—Skins and skeletons of mammals, fish, and invertebrates, in alcohol; Greenland.

Wm. Stimpson.—Miscellaneous invertebrata from New England.

Capt. S. Van Vliet, U. S. A.—Skeleton of peccary; skins of birds; alcoholic specimens of reptiles, fishes, and crustacea, from the lower Rio Grande.

Col. B. L. C. Wailes.—Living tortoises, fossils, fishes, and reptiles, in alcohol, &c., from Mississippi.

Rev. Dr. Wheeler.—Lignite from Brandon, Vermont; *Osceola elapsoidea* from Florida.

Prof. Alexander Winchell.—Fossils, plants, reptiles, birds, &c., from Eutaw, Alabama; plants, fossils, and fishes, from Selma, Alabama.

Dr. S. Wylie Crawford, U. S. A.—Skin of *Cyrtonyx massena* from Texas.

List of meteorological observers reporting to the Smithsonian Institution at the beginning of 1854, *compiled by Lorin Blodget.*

State.	Name.	Residence.
Nova Scotia	Henry Poole	Albion Mines, Pictou.
Canada	Dr. Charles Smallwood	St. Martin's, near Montreal.
Maine	Rev. Samuel H. Merrill	Oldtown, Penobscot county.
	J. D. Parker	Steuben, Washington county.
	James G. Garland	Biddeford, York county.
	John J. Bell	Carmel, Penobscot county.
	Samuel A. Eveleth	Windham, Cumberland county.
	Joshua Bartlett	South Thomaston, Lincoln county.
	George W. Burrows	Fryeburg, Oxford county.
	William D. Dana	Perry, Washington county.
New Hampshire	George B. Sawyer	Salmon Falls, Stafford county.
	Robert C. Mack	Londonderry, Rockingham county
	Dr. William Prescott	Concord, Merrimack county.
	Hon. S. N. Bell	Manchester, Hillsborough county.
	Rev. L. W. Leonard	Exeter, Rockingham county.
	Albert A. Young, Prof. Ira Young	Hanover, Grafton county.
Vermont	John K. Colby, J. P. Fairbanks	St. Johnsbury, Caledonia county.
	Charles A. J. Marsh	Craftsbury, Orleans county.
	D. Buckland	Brandon, Rutland county.
	D. Underwood	Castleton, Rutland county.
	Prof. Zadok Thompson	Burlington, Crittenden county.
Massachusetts	William Bacon	Richmond, Berkshire county.
	Prof. E. G. Snell	Amherst, Hampshire county.
	Dr. Edward A. Smith	Worcester, Worcester county.
	Dr. H. C. Perkins	Newburyport, Essex county.
	Hon. John Brooks	Princeton, Worcester county.
	Dr. John George Metcalf	Mendon, Worcester county.
	Lucius C. Allen	Springfield, Hampden county.
	Samuel Rodman	New Bedford, Bristol county.
	Amasa Holcomb	Southwick, Hampden county.
	B. R. Gifford	Barnstable, Barnstable county.
	Henry Rice	North Attleboro', Bristol county.
	Hon. William Mitchell	Nantucket.
Rhode Island	Henry C. Sheldon	North Scituate, Providence.
	Prof. A. Caswell	Providence.
Connecticut	Rev. Tryon Edwards, D. D.	New London, New London county.
	Daniel Hunt	Pomfret, Windham county.
	James Rankin	Saybrook, Middlesex county.
	Dr. Ovid Plumb	Salisbury, Litchfield county.
New York*	Prof. Edward A. H. Allen	Troy, Rensselaer county.
	Thomas B. Arden	Beverly, Putnam county.
	Charles A. Avery	Senaca Falls, Seneca county.
	Prof. O. W. Morris	Institution for Deaf and Dumb, N. Y.
	C. Thurston Chase	Chatham, Columbia county.
	E. A. Dayton	Madrid, St. Lawrence county.
	E. W. Johnson	Canton, St. Lawrence county.
	Dr. P. O. Williams	Gouverneur, St. Lawrence county.

* New York Academy system in separate list.

LIST—Continued.

State.	Name.	Residence.
New York	J. H. Hart	Oswego, Oswego county.
	E. N. Byram	Sag Harbor, Suffolk county.
	C. S. Woodward	Beaver Brook, Sullivan county.
	Walker D. Yale	Houseville, Lewis county.
	John Bowman	Baldwinsville, Onondaga county.
	John Lefferts	Lodi, Seneca county.
	Elias O. Salisbury	Buffalo, Erie county
	Laurens A. Langdon	Falconer, Chautauque county.
	Dr. Stillman Spooner	Wampsville, Oneida county.
	L. F. Munger	Albion, Orleans county.
	John F. Jenkins	North Salem, Westchester county.
New Jersey	Robert L. Cooke	Bloomfield, Essex county.
	Prof. Adolph Frost	Burlington, Burlington county.
	W. A. Whitehead	Newark, Essex county.
Pennsylvania	Dr. A. C. Blodget	Youngsville, Warren county.
	W. O. Blodget	Sugar Grove, Warren county.
	Samuel Brown	Bedford, Bedford county.
	John Comly	Byberry, Philadelphia county.
	Joseph Edwards	Lima, Delaware county.
	Dr. R. P. Stevens	Ceres, McKean county.
	Francis Schriener	Moss Grove, Crawford county.
	W. W. Wilson	Pittsburg, Alleghany county.
	Prof. M. Jacobs	Gettysburg, Adams county.
	Fenelon Darlington	Pocopson, Chester county.
	Ebenezer Hance	Morrisville, Bucks county.
	Dr. J. Heisely	Harrisburg, Dauphin county.
	Rev. D. J. Eyler	Waynesboro', Franklin county.
	J. R. Lowrie	Hollidaysburg, Blair county.
	Rev. J. Grier Ralston	Norristown, Montgomery county.
	Prof. J. A. Kirkpatrick	Philadelphia, Philadelphia county.
	Dr. Paul Swift	Haverford, Philadelphia county.
Maryland	Prof. William Barr, Miss H. M. Barr	Sykesville, Carroll county.
	Prof. L. H. Steiner	Baltimore, Baltimore county.
	Henry E. Hanshaw	Frederick, Frederick county.
Virginia	John W. Marvin	Winchester, Frederick county.
	Prof. George R. Rosseter	Buffalo, Putnam county.
	Dr. Thomas Patton	Lewisburg, Greenbrier county.
	Benjamin Hallowell	Alexandria, Alexandria county.
	Prof. N. B. Webster	Portsmouth, Norfolk county.
	David Turner	Richmond, Henrico county.
	Lieut. R. F. Astrop	Crichton's store, Brunswick county.
	William S. Kern	Huntersville, Pocahontas county.
North Carolina	Rev. Frederick Fitzgerald	Jackson, Northampton county.
	Prof. James Phillips	Chapel Hill, Orange county.
South Carolina	Thornton Carpenter	Camden, Kershaw county.
Georgia	Dr. John F. Posey	Savannah, Chatham county.
	R. P. Gibson	Whitmarsh Island, Chatham co.
	Prof. John Darby	Culloden, Monroe county.
	Dr. E. M. Pendleton	Sparta, Hancock county.
Florida	Dr. A. S. Baldwin	Jacksonville, Duval county.
	Judge Aug. Steele	Cedar Keys, Levy county.

LIST—Continued

State.	Name.	Residence.
Florida	John Newton	Knox Hill, Walton county.
	John Pearson, master navy-yard	Pensacola, Escambia county.
Alabama	S. J. Cumming	Monroeville, Monroe county.
	Prof. H. Tutwiler	Havana, Greene county.
	Prof. M. Tuomey	Tuscaloosa, Tuscaloosa county.
	Benjamin F. Holley	Wetokaville, Talladega county.
Mississippi	Rev. E. Robinson	Garlandsville, Jasper county.
Louisiana	Dr. E. H. Barton	New Orleans, Orleans county.
Texas	Dr. S. K. Jennings	Austin, Travis county.
	Prof. J. C. Ervendberg	New Weld, Comal county.
Tennessee	Commandant navy-yard	Memphis, Shelby county.
	Prof. A. P. Stewart	Lebanon, Wilson county.
	W. M. Stewart	Glenwood, near Clarksville, Montgomery county.
	Prof. George Cooke	Knoxville, Knox county.
Kentucky	Dr. John Swain	Ballardsville, Oldham county.
	Rev. J. Miller	Millersburg, Bourbon county.
	O. Beatty	Danville, Boyle county.
	Lawrence Young	Springville, near Louisville, Jefferson county.
	A. H. Bixby	Pleasant Valley, Nicholas county.
	E. L. Bethune	Maysville, Mason county.
Ohio	Prof. R. S. Bosworth	College Hill, Hamilton county.
	L. Gronewez	Germantown, Montgomery county.
	Rev. J. McD. Matthews	Hillsborough, Highland county.
	George L. Crookham	Jackson C. H., Jackson county.
	J. G. F. Holston	Zanesville, Muskingum county.
	Prof. S. N. Sanford	Granville, Licking county.
	Prof. J. W. Andrews	Marietta, Washington county.
	F. A. Benton	Mt. Vernon, Knox county.
	E. Spooner	Keen, Coshocton county.
	Prof. J. H. Fairchild	Oberlin, Loraine county.
Michigan	Dr. Thomas Whelpy	Brest, Monroe county.
	L. Woodruff	Ann Arbor, Washtenaw county.
	Dr. M. K. Taylor	Brooklyn, Jackson county.
	Dr. W. M. Campbell	Battle Creek, Calhoun county.
	James J. Strong	St. James, Beaver Island.
	Rev. George Duffield, D. D.	Detroit, Wayne county.
Indiana	Prof. Joseph Tingley	Greencastle, Putnam county.
	W. W. Austin	Richmond, Wayne county.
	Dr. V. Kersey	Milton, Wayne county.
	John Chappellsmith	New Harmony, Posey county.
Illinois	Dr. L. B. Mead	Augusta, Hancock county.
	Joel Hall	Athens, Menard county.
	Dr. John James	Upper Alton, Madison county.
	Dr. J. O. Harris	Ottawa, La Salle county.
	Prof. William Coffin	Batavia, Kane county.
Missouri	Dr. George Engelmann	St. Louis, St. Louis county.

LIST—Continued.

State.	Name.	Residence.
Missouri	O. H. P. Lear	Hannibal, Marion county.
Iowa	Dr. J. E. Ball	Keokuk, Lee county.
	Dr. Benjamin F. Odell	Poulteney, Delaware county.
	Dr. E. C. Bidwell	Quasqueton, Buchanan county.
	D. E. Read	St. Mary's, Mills county.
	P. G. Parvin	Muscatine, Muscatine county.
	Dr. Asa Horr	Dubuque, Dubuque county.
Wisconsin	Dr. J. L. Pickard	Plattsville, Grant county.
	Prof. S. P. Lathrop	Beloit, Rock county.
	J. F. Willard	Janesville, Rock county.
	Thomas Gay, esq	Bellefontaine, Marquette county.
	Prof. S. H. Carpenter	Madison, Dane county.
	Edward S. Spencer	Summitt, Waukesha county.
Minnesota	Rev. Elisha W. Carver	Red Lake, Pembina county.
	Rev. S. R. Riggs	Lac qui Parle, Dahkota county.
	Rev. D. B. Spencer	St. Joseph's, Pembina county.

New York University system.

Name.	Station.
Prof. C. Dewey, D. D	Rochester, Monroe county.
Charles A. Avery	Seneca Falls, Seneca county.
Dr. M. M. Bagg	Utica, Oneida county.
E. A. Dickinson	Jamestown, Chautauque county.
W. H. Gillespie	Mexico, Oswego county.
Charles J. Hazeltine	Cherry Valley, Otsego county.
Ira F Hart	Elmira, Chemung county.
T. H. Bates	Booneville, Oneida county.
Prof. O. Root	Hamilton College, Oneida county.
W. E. Guest	Ogdensburg, St. Lawrence county.
John F. Jenkins	North Salem, Westchester county.
John Kruger	Do do do.
Prof. O. W. Morris	Institution for Deaf and Dumb, N. York city.
E. W. Johnson	Canton, St. Lawrence county.
W. C. Kenyon	Alfred, Alleghany county.
D. T. Mayhew	Lowville, Lewis county.
W. Root Adams	Do do do.
W. McLaren	Glen's Falls, Warren county.
Warren P. Adams	Do do do.
Samuel A. Law	Meredith, Delaware county.
Rev. W. D. Wilson	Geneva, Ontario county.
H. H. Poucher	Hudson, Columbia county.
Judge E. C. Reed	Homer, Cortland county.
John S. D. Taylor	Plattsburg, Clinton county.
John D. Watkins	Liberty, Sullivan county.
Frederick L. Hanford	Do do do.
J. H. Wines	East Hampton, Suffolk county.
Rev. Thomas M. Strong, D. D	Flatbush, Kings county.
J. O. Stratton	Oxford, Chenango county.
Charles H. Payson	Pompey, Onondaga county.
A. Porteus	Adirondack, Essex county.
F B. Downes	Ithaca, Tompkins county.

LIST—Continued.

Name.	Station.
H. H. Hall	Newburgh, Orange county.
C. W. Heywood	Rochester, Monroe county.
Lyman W. Conkey	Syracuse, Onondaga county.
D. H. Cochran	Fredonia, Chautauque county.
Prof. George H. Cook	Albany, Albany county.
John N. Brinkerhoff	Union Hall, Jamaica, Queen's county.

Observations transmitted in series or summaries.

State.	Name.	Residence.
Canada	Magnetic and meteorological observatory	Toronto, Canada.
Indiana	Dr. Thomas Edmondson	Baltimore.
South Carolina	Rev. A. Glennie	Waccamaw.
Florida	William C. Dennis	Key West.
Missouri	Dr. George Engelmann	St. Louis.
Iowa	E. H. A. Scheeper	Pella, Marion county.
California	Dr. J. H. Gibbons	San Francisco.
Bermuda	Surgeon Wellis	Centre Signal Station, Inland Island.
Montreal	J. H. Huguet Latour	
	Dr. Archibald Hall	
Central America	M. B. Halsted	Panama.
South America	Edward A. Hopkins	Ascension, Paraguay.

Observers commencing since January, 1854, *up to June* 1, 1854.

State.	Name.	Residence.
Massachusetts	Dr. James W. Robbins	Uxbridge, Worcester county.
	B. R. Gifford	Wood's Hole, Barnstable county.
	Albert Schlegel	Taunton, Bristol county.
	Prof. P. A. Chadbourne	William's College, Williamstown.
Rhode Island	Samuel Powel	Newport, Newport county.
	George Manchester	Portsmouth, Newport county.
Connecticut	T. S. Gold	West Cornwall, Litchfield county.
	Prof. John Johnston	Middletown, Middlesex county.
New York	Dr. E. M. Alba	Angelica, Alleghany county.
	John F. Jenkins	White Plains, Westchester.
	Warren P. Adams	Glen's Falls, Warren.
	Rev. W. D. Wilson	Geneva, Ontario county.
	Dr. Sandford B. Hunt	Buffalo, Erie county.
New Jersey	Prof. George H. Cook	New Brunswick, Middlesex county.
Pennsylvania	J. R. Lowrie	Warrior's Mark, Huntingdon co.
	R. Weiser	Andersville, Perry county.
	Prof. Thickstun	Meadville, Crawford county.

LIST—Continued.

State.	Name.	Residence.
Maryland	Rev. John P. Carter	Hagerstown, Washington county.
Virginia	Jed. Hotchiss	Bridgewater, Rockingham county.
	A. Nettleton	Lynchburg, Campbell county.
North Carolina	J. Bryant Smith, M. D.	Lincolnton, Lincoln county.
South Carolina	Thornton Carpenter	Charleston, Charleston county.
	H. W. Ravenel	Aiken, Barnwell county.
Georgia	William Schley	Augusta, Richmond county.
	Prof. Wm. D. Williams	Madison, Morgan county.
Mississippi	Rev. J. Avery Shepherd	Lake Washington, Washington co.
	Wm. Henry Waddell	Grenada, Yalabusha county.
	Prof. L. Harper	Oxford, La Fayette county.
	A. R. Green	Jackson, Jackson county.
Louisiana	Prof. W. P. Riddell	New Orleans, Orleans county.
Kentucky	A. H. Bixby	Lafayette, Christian county.
	J. D. Shane	Lexington, Fayette county.
Ohio	John Ingram	Savannah, Ashland county.
	D. G. W. Livesay	Gallipolis, Gallia county.
	Dr. J. P. Kirtland	East Rockport, Cuyahoga county.
	Edmund W. West	Huron, Erie county.
Michigan	Dr. S. F. Mitchell	East Saginaw, Saginaw county.
	Alfred E. Carrier	Grand Rapids, Kent county.
	Prof. Alexander Winchell	Ann Arbor, Washtenaw county.
Indiana	J. Knauer	Kendallville, Noble county.
	W. B. Coventing	Do do do.
	Daniel H. Roberts	New Garden, Wayne county.
Iowa	E. H. A. Scheeper	Pella, Marion county.
Wisconsin	G. Z. Livingston	Hudson, St. Croix county.
	J. A. Lapham	Milwaukie, Milwaukie county.
	Prof. William Porter	Beloit, Rock county.
Minnesota	Rev. Solon W. Mauncey	Fort Ripley.
	Dr. C. L. Anderson	St. Anthony's Falls, Ramsey county.
Oregon	John D. Post	Oregon City.
California	Dr. J. H. Gibbons	San Francisco.

REPORT OF THE EXECUTIVE COMMITTEE.

The Executive Committee submit to the Board of Regents the following report, relative to the present state of the finances, and the expenditures during the year 1853.

They are happy to inform the board that, after a strict examination of the accounts, they are enabled to present a very satisfactory statement of the present condition of the finances, and the result of the investigations as to the expenditures during the year.

The whole amount of the Smithsonian bequest, deposited in the treasury of the United States, (from which an annual income, at 6 per cent., is derived of 30,910 14,) is..... $515,169 00

Amount of unexpended interest, reported last year as in charge of Messrs. Corcoran & Riggs.....	$208,800 00	
From which deduct amount expended on the building during the past year.....	29,391 98	
	179,408 02	
Of this it is proposed to expend the further sum of.....	29,408 02	
Which will leave to be added to the principal, according to the original proposition of Professor Bache.....		150,000 00
The whole fund will then be.....		665,169 00

Statement in relation to the expenditures of the Smithsonian Institution during the year 1853.

BUILDING, FURNITURE, FIXTURES, ETC.		
Pay on contracts	$25,500 00	
Pay of architects, superintendents, &c	1,580 70	
Magnetic observatory	1,578 28	
Expenses of building committee	77 00	
Miscellaneous, incidental to building	184 84	
Furniture, &c., for uses in common	354 05	
Furniture for library	117 11	
		$29,391 98
GENERAL EXPENSES.		
Expenses of Board of Regents	195 00	
Lighting and heating	646 47	
Postage	364 28	
Transportation	1,913 19	
Stationery	6 50	
General printing	894 19	
Apparatus	203 50	
Incidentals, general	*3,352 42	
Watchman	367 00	
Salaries, general	4,099 92	
		12,042 47
PUBLICATIONS, RESEARCHES, AND LECTURES.		
Smithsonian Contributions to Knowledge	8,160 04	
Reports on progress of knowledge	139 29	
Other publications	1,116 58	
Meteorology	2,346 51	
Pay of lecturers	783 00	
Illustrations and apparatus for lectures	661 84	
Attendance and lighting lectures, &c	445 40	
		13,652 66
LIBRARY, MUSEUM, AND GALLERY OF ART.		
Cost of books	841 75	
Stereotyping and printing	1,318 42	
Incidentals to library	1,581 02	
Salaries, library	2,499 96	
Explorations, museum	250 00	
Expense of collections, museum	240 04	
Incidentals, museum	229 71	
Salaries, museum	1,999 92	
		8,960 82
Total expenditures in 1853		$64,047 93

* Including $948 34 charged for interest on over-drafts during the year.

The following is a general view of the receipts and expenditures for the year 1853:

RECEIPTS.		
Balance in the treasury, as per last report	$250 49	
Interest on the original fund for the year 1853	30,910 14	
Interest on the extra fund for the year 1853	10,440 00	
		$41,600 63
EXPENDITURES, EXCLUSIVE OF BUILDING.		
For items common to the objects of the Institution	12,042 47	
For publications, researches, and lectures	13,652 66	
For library, museum, and gallery of art	8,960 82	
Balance in the treasury	6,944 68	
		$41,600 63

An appropriation of $30,000 was made at the last meeting of the Board of Regents, to be expended under the direction of the Executive Committee and the Secretary, for carrying on the operations of the Institution.

From the foregoing statement of accounts it will be seen that, while the library and museum have had their share of the appropriation, the active operations have exceeded their part by upwards of $4,000. This excess has been caused, principally, by printing and preparing for the press a number of memoirs, which are to form the volume of contributions for the year 1854.

Whatever may be the future distribution of the income, a greater expenditure than has been made for the library and museum, during the past year, could not, in the opinion of the committee, have been judicious.

The additions to the library and museum, the former of which were chiefly in return for the publications, of the Institution under the system of exchanges, have been considerable and valuable. A particular estimate of these will be presented to the Board hereafter.

The Board are referred to the report of the secretary, recently submitted, for a detailed account of the operations of the Institution during the past year. The committee think that these operations are in harmony with the law of Congress, with the objects of the founder of the Institution, and successfully carry out his idea of the increase and diffusion of knowledge.

After the present year, during which the building will probably be completed, the fund for annual expenditures will be somewhat enlarged, and increased benefits, it is hoped, will be realized.

J. A. PEARCE,
A. D. BACHE,
J. G. TOTTEN,
Executive Committee.

REPORT OF THE BUILDING COMMITTEE.

The Building Committee of the Smithsonian Institution beg leave to present to the Board of Regents the following report of their operations and expenditures during the year 1853:

It will be recollected by the Regents that the first plan of the Smithsonian building contemplated finishing the interior with wood and plaster, and that the Board subsequently adopted a resolution directing the wood-work to be removed and its place to be supplied with fire-proof materials.

In accordance with this resolution, the Building Committee directed plans and estimates to be made by Captain B. S. Alexander, of the United States corps of engineers. These plans were laid before the Board at the last meeting, and approved; reserving, however, to the Building Committee the right to make any changes which they might think desirable during the progress of the work. Mr. Renwick having retired from the office of architect, Captain Alexander was appointed in his place.

It will also be recollected by the Board that, shortly before the close of their last session, Mr. Gilbert Cameron, the former contractor, petitioned the Regents to be allowed to finish the building, alleging that, if he was not granted this privilege, his reputation as a builder would be injured; and also affirming that he was legally entitled to be allowed to complete the work, by the terms of his original contract, which the Board had never declared forfeited.

This subject was referred to the Building Committee, and legal advice was asked by them, in reference to it, from J. M. Carlisle esq., who has acted for some years as counsel to the Board of Regents. His opinion was in favor of the claims of Mr. Cameron. The question was also submitted to P. R. Fendall, esq., United States district attorney, who coincided in opinion with Mr. Carlisle.

In accordance with these opinions, the committee concluded to let Mr. Cameron proceed with the work on the terms which he had previously submitted to them, and which was within the estimate which had been made by the architect.

Some delay unavoidably took place in arriving at this decision, and consequently the work was not commenced until June 13, 1853. Since then, however, it has been prosecuted with great vigor, and to the entire satisfaction of the committee. The roof has been temporarily secured, the entire frame of wood-work which occupied the interior removed, and a cellar excavated. A large brick sewer has been constructed through the middle of the building, and carried outward toward the canal, by which the cellar may be thoroughly drained and all waste water discharged. The foundation walls, piers, and arches, of a spacious and commodious basement, have been completed; the piers in the main story have been built, and the beams and arches of

the floor for the rooms above finished. The brick-work of the upper story has also been completed; in short, the masonry from the foundation to the roof, and more than nine-tenths of the brick-work, have been finished. The principal part of the work yet remaining to be accomplished, according to the statement of the architect, may be classified as follows:

1. Finishing the necessary stairways for the lecture-room and gallery.
2. Supporting the roof, so that the columns in the second story may be dispensed with.
3. Completing the interior finish, such as flooring, plastering, painting, &c.
4. Fitting up the lecture-room with seats.

The Committee found great difficulty in deciding upon a proper position and plan of a lecture-room, and, after much deliberation and frequent consultations, finally concluded to place it in the second story, in the middle of the main building, where the greatest width could be obtained.

The original plan contemplated the placing of the large lecture-room on the first floor; but in this position it was impossible to procure a sufficient space, uninterrupted by large columns, which would materially interfere with the employment of the room for the purpose intended. In endeavoring to overcome this difficulty, it was at one time proposed to support the floor of the whole space of fifty feet in width by means of heavy girders; but this being considered unsafe, the idea was abandoned. The only plan, therefore, at the option of the committee for providing a suitable lecture-room, was that which has been adopted. According to the present income and policy of the Institution, this is cheaper than any other plan proposed; and should the building ever be required for other purposes, such as an entire museum or library, the division walls could easily be removed, and the whole space reconverted into one large room. The plan adopted, therefore, makes the best provision for the present wants of the Institution, and can readily be adapted to any proposed change in the future application of the building. The whole of the first story has been thrown into one large room, with arrangements for dividing it, if necessary, by screens, into two apartments, with a central hall or wide passage between.

The committee have kept constantly in view the idea of rendering the main building entirely fire-proof, and of constructing it in the most durable and substantial manner. This they have been enabled to accomplish through the constant supervision of Captain Alexander, who, as it appears to the committee, has successfully evinced in this work a combination of practical skill and scientific knowledge.

From a comparison of the work done with that which remains to be accomplished, the architect is of opinion that, should nothing happen to prevent it, the building will be finished during the present year, and at a cost within the estimate; consequently, the $58,000 recommended to be set aside by the Executive Committee in their last report, together with a portion of the income of the past year, will be sufficient to defray all the expenses, and leave the $150,000 untouched. This refers, however, mainly to the completion of the building, and not to

the furniture, which must be purchased by degrees out of the accruing interest on the above-mentioned sum.

At the last session of the Board of Regents a resolution was adopted authorizing the erection of a small building for a magnetic observatory. This structure has been completed, and is now furnished with instruments, and will soon be in successful operation. It consists of a small room twelve feet by sixteen, under ground, enclosed by a nine-inch brick wall, within which the instruments are placed. This room is surrounded by a rough stone wall, leaving a space of two feet in width on each side to permit a free circulation of air, for keeping the interior apartment dry. Above ground the structure is of wood, so finished as to correspond to some extent with the architecture of the Smithsonian building, and consists principally of an entry and one room sixteen feet square, to serve as an office and computing room for the observer. The whole cost of this building is $1,578 28. The entire expenditure on the building during the past year, exclusive of the magnetic observatory, is as follows:

Pay on contracts	$25,500 00
Architect and draughtsmen	1,580 70
Miscellaneous incidentals	261 84
Furniture	471 16
	27,813 70

Respectfully submitted.

RICHARD RUSH,
JOHN W. MAURY,
JOSEPH HENRY,
Executive Committee.

PROCEEDINGS

OF THE

BOARD OF REGENTS.

SEVENTH ANNUAL SESSION OF THE BOARD OF REGENTS.

[Continued from last Report.]

WASHINGTON, *March* 12, 1853.

The Board of Regents met this day at 10 o'clock a. m. Present: Messrs. Colcock, Fitch, Mason, Maury, Totten, the Secretary, and W. W. Seaton, treasurer.

The proceedings of the last meeting were read and approved.

The Secretary brought before the Board the subject of the disposition of the surplus fund, and stated that Messrs. Corcoran & Riggs had offered to allow interest at five per cent. if the deposit was continued with them.

Mr. Fitch offered the following resolution, which was adopted:

Resolved, That the surplus fund of $208,000 now on deposit with Corcoran & Riggs, be continued with them for twelve months, on their proposition to pay interest thereon at five per cent.; provided, that a part thereof, not exceeding $58,000, may be withdrawn for building expenditures during the year, and that they deposit the same or equivalent securities to those now held therefor, to be approved by the Regents then in Washington and the Secretary.

Mr. Colcock offered the following resolution, which was adopted:

Resolved, That during the year 1853 the sum of thirty thousand dollars ($30,000) out of the Smithsonian income be, and is hereby, appropriated, to be expended under the direction of the Secretary, and with the advice of the Executive Committee, to defray the expenses of the Institution, and to carry out the several parts of the programme.

The Secretary brought before the Board the question of a new division of the income of the Institution, rendered necessary by the increase of the general expenses, of the addition to the sum contemplated for finishing the centre building for the library and collections, and other causes.

Mr. Fitch offered the following resolution, which was adopted:

Resolved, That the subject of the distribution of the income of the Institution, in the manner contemplated by the original plan of organization, be referred to a Select Committee, to consist of Messrs. Pearce, Mason, Rush, Bache, Choate, Totten, and Maury, for a report at the next session of the Board of Regents of such changes, if any, as in their opinion are desirable; and that the same committee be instructed to report fixed regulations relative to the reception of donations, &c.

General Totten offered the following resolution, which was adopted:

Resolved, That the Building Committee and the Executive Committee jointly, be instructed to take into consideration and decide upon the propriety of making such alterations in the east wing of the Smithsonian building as to convert it into a suitable dwelling for the Secretary, and that the Building Committee carry into effect the decision of the Joint Committee.

The Board then, on motion, adjourned *sine die*.

EIGHTH ANNUAL SESSION OF THE BOARD OF REGENTS.

WASHINGTON, *January* 4, 1854.

In accordance with a resolution of the Board of Regents of the Smithsonian Institution, fixing the time of the beginning of their annual meeting on the first Wednesday of January of each year, the Board met this day in the Regents' room.

Present: Messrs. English, Mason, Maury, Stuart, Totten, and the Secretary.

In the absence of the Chancellor, and on motion of Mr. Maury, Mr. Mason was called to the chair.

The Secretary informed the Board of the reappointment of Mr. Meacham, of Vermont, and the appointment of Hon. Wm. H. English, of Indiana, and Hon. David Stuart, of Michigan, as Regents of the Smithsonian Institution on the part of the House of Representatives of the present Congress.

The Secretary stated that the accounts and reports of the Institution would be ready for presentation at the next meeting; whereupon, the Regents, after examining the building, adjourned to meet on Saturday, 14th January, at 10 o'clock a. m.

WASHINGTON, *January* 14, 1854.

An adjourned meeting of the Board of Regents of the Smithsonian Institution was held in the Smithsonian building on Saturday, January 14, at 10 o'clock a. m.

Present: Messrs. Bache, English, Mason, Maury, Meacham, Pearce, Stuart, Taney, Totten, the Secretary, and W. W. Seaton, esq., Treasurer.

The Chancellor, Hon. Roger B. Taney, took the chair.

The proceedings of the last meeting were read and approved.

The Secretary informed the Board that a meeting of the "Establishment" had been called, by order of the President of the United States, in May last. The proceedings of the meeting were then read.

Mr. Maury, on the part of the Building Committee, submitted its report; which was read and adopted.

The Treasurer, W. W. Seaton, esq., presented the details of the expenditures during the year 1853; also, a general statement of the

finances; which were, on motion, referred to the Executive Committee.

The Secretary called the attention of the Board to the fact that a resolution had been adopted by the House of Representatives appointing a committee of nine to inquire into the expediency of withdrawing the Smithsonian fund from the Treasury of the United States, and investing it in some safe stocks.

On motion of Mr. Mason, the consideration of the subject was postponed until the Secretary should be called upon by the committee of the House for information, and his report was presented to the Board.

The Secretary presented his report of the operations of the Institution for the year 1853, which was in part read.

On motion of Mr. Maury, it was

Resolved, That the vacancy existing in the Building Committee be filled by nomination of the Chair.

Whereupon, Mr. Wm. H. English was appointed.

The Board then adjourned to meet on Saturday, January 28, at 10 o'clock a. m.

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WASHINGTON, *January* 28, 1854.

An adjourned meeting of the Board of Regents was held on Saturday, January 28, 1854, at 10 o'clock a. m.

Present: Messrs. Bache, English, Maury, Meacham, Pearce, Stuart, Taney, Totten, of the Board; W. W. Seaton, esq., treasurer; and the Secretary.

The Chancellor took the chair.

The minutes of the last meeting were read and approved.

The Secretary stated to the Board that Hon. Joseph R. Chandler had offered to present to the House of Representatives the petition of the Board relative to funding the $150,000 of surplus income in the treasury of the United States, and to move that it might be referred to the committee which had been appointed by the House relative to the Smithsonian fund.

Whereupon, on motion of Mr. Pearce, the original memorial of the Board to Congress was referred to the Executive Committee, with instructions to make such modifications in the wording of it as in their judgment might be rendered necessary by present circumstances.

A petition was presented from Gilbert Cameron, the contractor of the building, requesting the payment of the money due him, which had been kept back on account of a law-suit between himself and one of the sub-contractors.

In reference to the same, Mr. Maury, on behalf of the Building Committee, presented a letter from J. M. Carlisle, esq., attorney of the Board, stating that the suit had been dismissed, and that the court had decided that the Board of Regents could not be sued. Mr. Maury also presented, on the part of the Building Committee, a letter from Joseph H. Bradley, esq., requesting that the money be retained by the Board until the before-mentioned law-suit was finally decided.

On motion of Mr. Pearce, the subject was referred to a committee,

with power to order the money to be paid, in whole or in part, if in their judgment it was thought proper.

The Chair appointed Messrs. Mason, Meacham, and Totten, as the committee.

The Secretary laid before the board a bill from Henry Parish for a copy of Canina's work on architecture, purchased by James Renwick, junior, for the Institution, in 1847, and now in the library, but which, according to an accompanying letter from Mr. Renwick, had never been paid.

On motion of Mr. Meacham, the Secretary was directed to settle the bill, provided, on examining the accounts, no evidence could be found of its having been paid.

The Building Committee exhibited to the Board the drawings for the new lecture-room.

The Secretary read the continuation of his report relative to the publications, correspondence, magnetism, and meteorology.

A number of letters received since the last meeting, and the answers to them, were read to illustrate the character of the correspondence of the Institution.

Mr. Meacham offered the following resolution:

Resolved, That the Secretary and other officers of the Smithsonian Institution be directed to furnish the Board of Regents with estimates of appropriations necessary to be made in order to carry on the Institution the ensuing year, according to the laws for its organization.

After some discussion, the resolution was postponed for further discussion until the next meeting.

On motion, the Board then adjourned to meet on Saturday, February 11, at 10 o'clock a. m.

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WASHINGTON, *February* 11, 1854.

A quorum not being present, the Board adjourned to meet on Saturday, February 18, at 10 o'clock a. m.

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WASHINGTON, *February* 18, 1854.

An adjourned meeting of the Board of Regents of the Smithsonian Institution was held on Saturday, February 18, 1854, at 10 o'clock a. m.

Present: Messrs. Bache, English, Maury, Meacham, Pearce, Taney, of the Board, and the Secretary.

The Chancellor took the chair.

The minutes of the last meeting were read and approved.

A communication was read by the Secretary in reference to the Wynn estate; which, on motion of Mr. Pearce, was referred to Mr. Mason, to whom prior communications on the same subject had been referred.

A memorial was presented from Dr. S. Spooner, of New York, offering to present to the Institution the original copper-plates of the Musée Francais and the Musée Royal, on condition that it would publish under his superintendence an edition of these works.

On motion of Mr. Pearce, the Secretary was directed, on the part of the Institution, respectfully to decline the proposition of Dr. Spooner, the Regents not considering themselves authorized to engage in such an enterprise.

The Secretary stated to the Board that Professor Wilson, of the English Commission to the Exhibition of the Industry of All Nations at New York, had presented to the Smithsonian Institution a set of models, casts, and drawings, to be used in teaching the arts of design.

The Secretary proposed to lend these to the Metropolitan Mechanics' Institute, of this city, for the use of its School of Design; which proposition was agreed to by the Board.

The Secretary read the correspondence between the Smithsonian Institution and the California Academy of Natural Sciences, in which the latter authorize the former to purchase a full set of meteorological and magnetic instruments for the use of the society; the means of defraying the expense of the purchase having been generously provided by its President, Dr. A. Randall.

A memoir on the "Europo-American Physical Man" was laid before the Regents, which had been submitted to the Institution for publication since the last meeting of the Board.

Professor Bache presented a specimen of the photographic register of the motions of the magnetic needle, taken at the magnetic observatory of the Smithsonian Institution.

The Secretary informed the Board that the annual meeting of the United States Agricultural Society would be held on the 22d instant, in the Smithsonian Institution, and read the following extract from the address of the President of that Society:

"Our location at the national capital gives us peculiar facilities for intercommunication and for intercourse with members of Congress, representing all parts of our widely-extended country. We may also secure many benefits from the Smithsonian Institution, whose objects are the general increase of knowledge and the promotion of science, objects so analogous to those of this Association as to give importance to the question whether reciprocal benefits might not be expected from closer relations. By the courtesy of this Institution we have been permitted to occupy their commodious apartments, and an inquiry should be made by our Executive officers, or a special committee, to ascertain what room or rooms can be obtained for the future accommodation of this Society. We need a public building, or offices in some existing edifice, for our Corresponding Secretary and Treasurer, for the preservation of our records, and of the agricultural seeds and products which are now in our possession, or may be hereafter required, and also for an agricultural library, museum, and cabinet."

On motion of Mr. Maury, the Secretary was authorized to offer such accommodations and facilities to the United States Agricultural Society as the Institution had at its disposal.

The continuation of the Secretary's report relative to the Library, Museum, and Exchanges, was presented, but the reading was postponed till the next meeting.

The resolution offered by Mr. Meacham, at the last meeting of the Board, was then taken up for consideration.

Mr. Pearce moved to amend it by inserting the "Executive Committee and the Secretary," in place of the "Secretary and the other officers of the Institution."

On motion of Mr. English, the resolution and amendment were referred to the Special Committee which was appointed at the last session on the distribution of the income of the Institution, consisting of Messrs. Pearce, Mason, Rush, Bache, Choate, Totten, and Maury.

As Mr. Choate had signified, in a letter to the Secretary, his inability to attend the meetings of this committee, on motion of Mr. English, his place was filled by the appointment of Mr. Meacham.

The Board then adjourned to meet on Saturday, February 25, at 10 o'clock a. m.

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WASHINGTON, *February* 25, 1854.

An adjourned meeting of the Board of Regents of the Smithsonian Institution was held on Saturday, February 25, 1854, at 10 o'clock a. m.

Present: Messrs. Douglas, English, Maury, Mason, Meacham, Pearce, Rush, Stuart, and the Secretary.

Hon. Stephen A. Douglas, appointed from the Senate of the United States as a Regent of the Institution to fill the vacancy occasioned by the expiration of the term of Hon. R. M. Charlton, appeared and took his seat in the Board.

In the absence of the Chancellor, Mr. Pearce was called to the chair.

The minutes of the last meeting were read and approved.

The Secretary laid before the Board, for inspection, the proof-sheets and illustrations of a memoir, by John Chappelsmith, on the tornado which occurred near New Harmony, Indiana, in 1852.

The Secretary stated that, in accordance with the resolution of the Board at its last meeting, the use of the lecture-room of the Institution had been given to the United States Agricultural Society, which had held its sessions there during the past week.

The continuation of the report of the Secretary was read.

The Board then adjourned to meet on Saturday, March 4, 1854.

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WASHINGTON, *March* 4, 1854.

A quorum not being present, the Board adjourned to meet on Saturday, March 11, 1854, at 10 o'clock a. m.

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WASHINGTON, *March* 11, 1854.

An adjourned meeting of the Board of Regents was held on Saturday, March 11, 1854, at 10 o'clock a. m.

Present: Messrs. Bache, English, Maury, Mason, Meacham, Pearce, Totten, and the Secretary.

In the absence of the Chancellor, Mr. Pearce was called to the chair.

The minutes of the last meeting were read and approved.

The report of the Executive Committee in relation to the finances

and expenditures of the Institution during the year 1853 was presented by the chairman, Mr. Pearce.

On motion of Mr. Mason, the report was accepted.

The committee to whom was referred the resolution of Mr. Fitch, offered at the last session, and also the resolution offered by Mr. Meacham, at the meeting of the Board, January 28, 1854, reported the following resolution, and stated that a full report on the general subject would be made hereafter:

Resolved, That the Executive Committee and the Secretary of the Institution be instructed to submit to the Board of Regents, at the commencement of each and every year, an estimate, in detail, of all sums which will be required for the expenditures of the current year, as a basis for specific appropriations to be made by the Board.

On motion, the resolution was adopted.

The Secretary stated to the Board that a memorial and resolution, relative to funding $150,000 in the Treasury of the United States, had been submitted by Hon. Joseph R. Chandler to the House of Representatives, and had been referred to the committee previously appointed by the House to consider the expediency of withdrawing the Smithsonian fund from the Treasury of the United States and investing it in some safe stock.

The Special Committee to whom was referred the subject of payment to Gilbert Cameron of the money due him which had been kept back on account of a law-suit between him and one of the sub-contractors, reported that they had "examined the question referred to them, and were of the opinion that the balance due Gilbert Cameron should be paid to him, and direct accordingly."

The Secretary stated that, in accordance with this direction, he had paid Mr. Cameron $10,000, but had reserved a part of the money until the account could be critically examined.

A memorial from the American Philosophical Society to the Congress of the United States, praying "that the President of the United States should be authorized to enter into such correspondence with the government of Great Britain as may secure, in a reasonable time, a proper uniformity of coinage in the mode that may be found most discreet and convenient," was laid before the Board for its co-operation and approval.

On motion of Mr. Mason, the subject was referred to the Executive Committee.

A communication was read from Mr. J. R. Lambdin, President of the American Academy of Fine Arts, Philadelphia, recommending that the Smithsonian Institution should procure moulds from the best and most useful specimens of the collection in the British Museum, known as the Elgin Marbles, and that, from these moulds, casts should be produced and sold at cost to such academies of art, &c., as may desire their possession.

On motion of Mr. Mason, this subject was referred to the Executive Committee.

The continuation of the report of the Secretary in relation to the Museum, Exchanges, &c., was read.

The Board then adjourned to meet at the call of the Secretary.

SPECIAL MEETING.

WASHINGTON, *April* 29, 1854.

A special meeting of the Board of Regents of the Smithsonian Institution, called by the Secretary at the request of Messrs. Meacham, English and Stuart, was held on Saturday, April 29, 1854, at 10 o'clock.

Present: Messrs. Bache, Douglas, Hawley, Maury, Meacham, Pearce, Taney, and the Secretary.

The Chancellor took the Chair. The minutes of the last meeting were read and approved.

Mr. Pearce, in behalf of the Executive Committee, presented the following estimate of the appropriations to be made for the year 1854.

The Executive Committee recommend the following appropriations for the present year from the income of the Institution:

For building			$7,00 00
For expenses of the meetings of the Board		$250 00	
For lighting and heating		600 00	
For postage		500 00	
For transportation and exchange		1,600 00	
For stationery		250 00	
For general printing		600 00	
For apparatus		350 00	
For incidentals general		835 00	
SALARIES GENERAL.			
Secretary	$3,500 00		
Clerk	1,000 00		
Book-keeper	200 00		
Janitor	400 00		
Laborer	250 00		
Watchman	365 00		
Extra clerk hire	300 00		
		6,015 00	
			11,000 00
Smithsonian contributions		6,000 00	
Reports on progress of knowledge		500 00	
Other publications		250 00	
Meteorology		3,000 00	
Computations		100 00	
Lectures		1,000 00	
			10,850 00
LIBRARY.			
Salary of Assistant Secretary	2,500 00		
Salaries of assistants in the library—one at $600, and another at $540	1,140 00		
Purchase of books	1,800 00		
Incidentals	160 00		
Binding	250 00		
Stereotyping	150 00		
		6,000 00	
MUSEUM.			
Salary of Assistant Secretary	2,000 00		
Explorations	250 00		
Alcohol, &c	250 00		
Assistance or labor	100 00		
Apparatus	100 00		
Incidentals	100 00		
Catalogue	500 00		
Glass jars	250 00		
		3,550 00	
			9,550 00
Contingencies			100 00
			38,500 00

The committee have not recommended an equal distribution between the active operations on the one hand, and the Library, Museum, &c., on the other, because the compromise resolutions which require such equality of distribution do not go into effect until the completion of the building.

J. A. PEARCE,
A. D. BACHE,
J. G. TOTTEN,
Executive Committee.

On motion of Mr. Pearce, the above report was laid upon the table.

The Secretary presented the following letter to the Board, in compliance with which he had called the special meeting:

WASHINGTON, *April* 13, 1854.

Prof. JOS. HENRY,
Secretary of the Smithsonian Institution:

In accordance with the provision of the third section of an act establishing the Institution, the undersigned request you to appoint a special meeting of the Regents on Saturday, the 29th inst., at 10 o'clock a. m.

J. MEACHAM,
W. H. ENGLISH,
D. STUART.

Mr. Meacham then stated the reasons why he had requested this special meeting.

Mr. Pearce stated that the subject brought before the Board by Mr. Meacham was now under consideration by a Special Committee appointed by the Regents, which would be ready to report at the next meeting.

On motion, the subject was postponed till the next meeting of the Board.

The Board then adjourned to meet on Saturday, May 13, at 10 o'clock a. m.

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WASHINGTON, *May* 13, 1854.

An adjourned meeting of the Board of Regents was held on Saturday, May 13, at 10 o'clock a. m.

Present: Messrs. Bache, Hawley, Maury, Meacham, Pearce, Totten, and the Secretary.

The Chancellor being absent, Mr. Hawley was called to the chair.

The minutes of the last meeting were then read, and after correction, approved.

Letters from Hon. R. B. Taney, Chancellor of the Institution, and from Hon. Richard Rush, stating their inability to attend this meeting of the Board, were read by the Secretary.

Mr. Pearce, chairman of the Special Committee on the resolutions of Messrs. Fitch and Meacham, stated that it was ready to report, but as it was considered desirable to have a full meeting of the Board when the subject should be discussed, he moved that the Board adjourn.

The Board then adjourned to meet on Saturday, 20th inst., at 10 o'clock a. m.

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WASHINGTON, *May* 20, 1854.

An adjourned meeting of the Board of Regents was held on Saturday, May 20th, at 10 o'clock a. m.

Present: Messrs. Bache, Choate, Douglas, English, Hawley, Maury, Mason, Meacham, Pearce, Stuart, Totten, and the Secretary.

In the absence of the Chancellor, Mr. Hawley was called to the chair.

The minutes of the last meeting were read and approved.

Mr. Pearce, chairman of the Special Committee appointed by the Board of Regents of the Smithsonian Institution, to whom were referred the resolutions of Hon. Mr. Fitch and Hon. Mr. Meacham relative to the distribution of the income of the Smithsonian fund, &c., made the following report:*

The committee, who were directed to report whether it is desirable to make any changes in the distribution of the income of the institution, in the manner contemplated by the original plan of organization, report as follows:

The distribution and application of the Smithsonian income should be made so as to answer most effectually and beneficially the purposes for which the Institution was endowed and established. In making such distribution and application, the Regents should faithfully observe the requirements of the act of Congress establishing the Institution, and exercise no discretion but that which the law allows to them.

The purpose of the Institution is disclosed in the title of the act, in its preamble, and in its first section. The title is "An act to establish the Smithsonian Institution for the increase and diffusion of knowledge among men." The preamble states the bequest, by James Smithson, of all his property to the United States, to found at Washington, under the name of the Smithsonian Institution, "an establishment for the increase and diffusion of knowledge among men." It declares the acceptance of the trust; and "therefore, for the faithful execution of the said trust according to the will of the liberal and enlightened donor," the first section constitutes an establishment by the name of the Smithsonian Institution "for the increase and diffusion of knowledge among men."

The fifth section enacts that the Regents shall cause to be erected "a suitable building of sufficient size, and with suitable rooms or halls for the reception and arrangement, upon a liberal scale, of objects of natural history, including a geological and mineralogical cabinet; also, a chemical laboratory, a library, a gallery of art, and the necessary

*This committee consisted of the following Regents: Hon. J. A. Pearce, Hon. J. M. Mason, Hon. Richard Rush, Hon. John W. Maury, Gen. J. G. Totten, Prof. A. D. Bache, and the Hon. J. Meacham. The gentleman last named does not concur in this report.

lecture-rooms," &c. This section points out certain means and instrumentalities by which the Institution is to "execute the trust" "according to the will of the liberal and enlightened donor." But it does not limit the Regents to these means and instrumentalities. A large discretion is elsewhere given to them to employ other means and instrumentalities "for the promotion of the purpose of the testator"—that is, "for the increase and diffusion of knowledge among men."

The eighth section, in its last clause, directs an annual appropriation, from the interest of the funds belonging to the Institution, "not exceeding an average of $25,000 annually, for the gradual formation of a library composed of valuable works pertaining to all departments of human knowledge."

And the ninth section enacts that of "any other moneys which have accrued, or shall hereafter accrue, as interest upon the said Smithsonian fund, not herein appropriated, or not required for the purposes herein provided, the said managers [Regents] are hereby authorized to make such disposal as they shall deem best suited for the promotion of the purpose of the testator, anything herein contained to the contrary notwithstanding."

Let us see, now, how far the Regents have complied with these requirements of the law,

They have caused to be erected a building, which is, in the judgment of the Board, suitable, of sufficient size, of plain and durable materials, with suitable rooms for the reception and arrangement, upon a liberal scale, of the objects mentioned in the fifth section of the act. The building, it is true, is not yet completed in all its parts. This has been the result, partly of design, and partly of accident. As the law specified no period within which the building should be completed, the time of its completion was necessarily within the discretion of the Regents. It was obvious that if they should not hurry its completion, but extend the work upon it through a series of years, they would save a large amount of accruing interest, which, when the building should be finished, might be added to the permanent fund, whereby the means of accomplishing the purposes of the testator would be largely increased. An additional reason for this was, that the structure, thus slowly and cautiously erected, would be more solid and permanent. This policy, therefore, was adopted, and it was determined that the building should be finished in five years. An accident, well known to the Board, and which in the end must prove to have been fortunate, required a change in the plan of a part of the edifice, and a larger expenditure of money. This cause has further delayed the completion of the building. But during the present year it will be finished on the liberal scale required by the law, and one hundred and fifty thousand dollars of accrued interest will be saved, to be added to the principal.

In the mean time, the Regents have made appropriations of money for the various objects specified in the fifth section of the act, by which and other means they have complied as well with the letter as the spirit of the law. A large and valuable collection of objects of natural history has been made, and, for the most part, classified; a geological and mineralogical cabinet has been provided, and a chemical laboratory has been fitted up, in which researches and experiments have been

made. The building contains an apartment intended for a gallery of art; and some works of art, a valuable collection of engravings, have been purchased.

A lecture-room has been finished, and for several years lectures have been given, at the expense of the Institution, on scientific and literary, abstruse and popular subjects, the admission to which has been free. A library of 12,000 volumes and 8,000 pamphlets and parts of volumes has been acquired by purchase, exchanges, and other means, containing many rare and valuable works pertaining to all branches of knowledge, such as are not to be found in general libraries, and are most highly prized by men of science and research.

This is a very good beginning, according to the plan, for the *gradual* formation of a library, which the act points out.

Of the entire amount expended from the commencement of the Institution, a little less than one-eighth has been given to researches and publications. The rest has been applied to the special objects mentioned in the act, and to the general expenses of the Institution.

In the act establishing the Institution, Congress carefully and wisely forebore to fix the amount or proportion of the annual income which should be appropriated to any of the objects mentioned in the fifth section. They did not even determine or limit the sum which should be expended on the building, nor have they in any manner indicated that prominence should be given to any particular means or instrumentality for increasing and diffusing knowledge. All this they have left to the discretion of the Regents, to whom they intrusted the conduct of the Institution. They have, indeed, declared that annual appropriations should be made for the *gradual* formation of a library, and have provided that such appropriations shall not exceed $25,000 in the average.

This is nothing but a limitation upon the discretion of the Regents, and can by no rule of construction be considered as intimating the desire of Congress that such sum should be *annually* appropriated. The limitation, while it prevented the Regents from exceeding that sum, left them full discretion as to any amount within the limit. The interest on the Smithsonian fund was about $30,000 per annum; and Congress could not but know that an appropriation of five-sixths of that amount per annum would leave a remainder entirely insufficient to defray the salaries and ordinary expenses of an Institution such as was designed by the act, and that nothing would be left for the care of collections, the lectures, and other means of promoting the purpose of the testator. In short, the act points out certain instrumentalities to be employed, in the execution of the trust, created by and for the purposes specified in the will of Smithson, and gives the managers or Regents authority to dispose of all the income not required for the purposes specified in the act, in such manner as they shall deem best suited for the promotion of the purpose of the testator. As Congress did not determine what portion of the income was to be applied to the purposes specified in the act, it follows that such determination is to be made by those to whom they intrusted the conduct of the business of the Institution; and thus the Regents are clearly invested with the power of determining how much of that income is required respectively for library, for museum, for lectures, or for any of the objects specified in the fifth

section, and what disposition they will make of so much of the income as they do not think requisite to apply to these objects. So the Regents of 1847, who adopted the plan of organization, understood the law. So they reported to Congress. The Board of Regents, however its members have been changed from time to time, have always so understood it; and Congress, to whom they have annually and faithfully reported their proceedings, have never questioned the propriety of the construction.

In organizing the Institution, different opinions indeed were entertained, by different members of the Board, as to the most effectual means of promoting the purpose of Smithson. The conflict of opinions resulted in the adoption of certain resolutions, which have been called the "compromise resolutions." These, while they recognise the intention of Congress, and the duty of the Regents, to provide for the accumulation of specimens of art and objects of natural history, and the gradual formation of a library pertaining to all branches of knowledge, &c., also declare it to be expedient, and demanded by the will of Smithson, that, in the plan of organization, the increase of knowledge by original research should form an essential feature; that for this end premiums should be offered for original papers containing positive additions to the sum of human knowledge; and that these and other suitable papers should be published, in transactions of the Institution; periodically or occasionally, &c. The seventh of these resolutions is in these words:

"*Resolved*, That for the purpose of carrying into effect the two principal modes of executing the act and trust pointed out in the resolutions herewith submitted, the permanent appropriations out of the accruing interest shall, *so soon as the buildings are completed*, be annually as follows—that is to say:

"*First.* For the formation of a library composed of valuable works pertaining to all departments of useful knowledge, and for the procuring, arranging, and preserving of the various collections of the Institution, as well of natural history, and objects of foreign and curious research, and of elegant art, as others, including salaries and all other general expenses connected with the same, excepting those of the first complete arrangement of all such collections and objects as now belong to the United States in the museum of the Institution, when completed, together with one-half of the salary of the Secretary, the sum of fifteen thousand dollars.

"*Secondly.* For the preparation and publication of transactions, reports, and all other publications of the Institution, including appropriations for original researches and premiums for original papers; for the delivery of all lectures and payment of all lecturers, and for all general expenses connected with said lectures and publications, together with one-half of the salary of the Secretary, the remainder of the annually accruing interest; it being understood that all general and incidental expenses not specially connected with either of the above two great divisions of the plan of the Institution shall be equally divided between them."

It will be seen that this division of the income of the Institution, between the two principal modes of executing the trust, was to be made so soon as "*the buildings were completed*," and not before.

As the building is not completed, this division is not yet obligatory under the compromise resolutions. For some years the annual appropriations for the purposes of the Institution were specific, and were applied accordingly. But during the last two years they have been general, and a discretion has been exercised by the Secretary and the Executive Committee, which has resulted in applying to researches, publications, and lectures, an amount somewhat larger than that which has been applied to the library, museum, &c. But this is clearly no violation, as has been charged, of a compromise which is not, by its very terms, to go into effect until the completion of the building.

The committee think it desirable that the appropriations should be specific, and have already so reported to the Board by a resolution submitted on the 11th of March, 1854; and at the last meeting of the Regents the Executive Committee submitted estimates of appropriations in detail for the present year.

Before expressing an opinion on *these resolutions*, the committee deem it their duty at this time to remark upon the plan which was discussed seven years ago, but which is now revived, of devoting the greater part of the income to the accumulation of a great library; thus either abandoning the active operations of research and publications, or so restricting this means of increasing and diffusing knowledge as to deprive it of all sensible value.

It has already been remarked that the language of the eighth section, which directs the gradual formation of a library, is not mandatory as to the amount which shall be thus expended, and that the ninth section authorizes the Regents, after applying so much of the income as may be required for the purposes mentioned in the act, to dispose of the residue of the interest upon the Smithsonian fund in such manner "as they shall deem best suited for the promotion of the purpose of the testator, anything herein contained to the contrary notwithstanding." It is manifest, from what has been said before, that these sections of the law leave to the Regents a large discretion as to the amounts to be applied to the objects specified in the act, and in the choice of other means for promoting the purpose of the testator.

What, then, are the considerations which should govern them in rejecting this plan, which proposes a great library as the best and chief, if not the only, means of executing the trust created by the will of Smithson, and fulfilling their own duty under the law?

The "increase and diffusion of knowledge among men" are the great purposes of this munificent trust. To increase knowledge implies research, or new and active investigation in some one or more of the departments of learning. To diffuse knowledge among men implies active measures for its distribution, so far as may be, among mankind.

Neither of these purposes could be accomplished or materially advanced by the accumulation of a great library at the city of Washington. This would be to gather within the walls of a building here those fruits of learning which had been reaped elsewhere. It would be the *living* of knowledge, not its increase and diffusion. It would be the collection of what philosophical inquirers, men of research, of observation, and of original thought, had ascertained, conceived, or invented, and already published to the world. But it would not of itself add to the sum of

human knowledge, it would not increase the stores of learning, but only bring them together. It would develop no new truths, reveal no hidden laws of nature, but only contain the record of what might be already known; so that in no proper sense could it be said to increase knowledge. Neither would it diffuse knowledge, except within a limited sphere. The Institution would necessarily be local, for, although it might aid the few men of research residing in Washington, and such students and investigators as occasionally visited the city, it would fail to accomplish the more extensive purpose of the testator and of the law, since it could not be expected to draw hither the great body of such men. These must always be scattered over the country, engaged in pursuits which require their residence elsewhere, and with only occasional opportunities of aiding their inquiries by resort to the library of the Smithsonian Institution. While, therefore, a well-selected library of valuable books pertaining to all departments of learning may well be one of the means employed by the Institution, its purpose requires other instrumentalities by which knowledge may be increased and diffused among men. We must never forget that both the will of Smithson and the act of Congress recognise that, as a *nation* is appointed the great dispenser of the fruits of his munificence, so these benefits are to be *universal*, and their recipients to be *men* everywhere and in all time.

If the language of the will had been "to increase and diffuse knowledge among *the people of the United States*," a library would be but a feeble and imperfect instrument as an active agent even for that limited purpose. The accumulation of books in the political centre of a great country, or even in the centre of population of a numerous people, would no doubt gratify the pride of the nation, and be attended with some profitable results. But such a library would not insure mental activity to inquirers who should live remote from its locality, and its relation to all increase of knowledge would be merely incidental. It would have no effective operation in the thirty-one States which constitute the nation or people of the Union, and instead of being diffusive in its nature, would be centralizing in its influence and passive in its character. Even if the will and the act of Congress were limited by the terms supposed, by no fair construction could the formation of a library be considered as an execution of the trust. But when we consider that the language of the will is not thus limited, and that the benefits of the bequest are intended for *mankind*, we cannot imagine how the establishment of a library could be considered as corresponding to the requisitions of a purpose so wide and liberal. That Smithson did not intend a library to be the prominent feature in the Institution contemplated by his bequest, may be inferred from the fact that his will did not mention it, when a single word would have been sufficient for this purpose. And that Congress did not design to indicate a library as the principal object of the establishment which they founded by law to carry out the purpose of Smithson, will be made to appear by an examination of the enactment.

In the construction of a law of Congress, the opinions expressed in the speeches of some of those who voted for it cannot be taken as the opinion of all or even of the major part of them, but the act must be

construed according to the general import and evident intention of all its parts.

If we can construe the law from its own provisions, it would be exceedingly unsafe and improper to interpret it by reference to the opinions of a portion only of those who voted for it, being the minor part of them. To do this would be to make the *opinions* of a few control the acts and intentions of the majority as expressed in the law, and in effect to give to those few the law-making power. In the present case the evident intention was to carry out the purpose of Smithson's will, namely: "the increase and diffusion of knowledge among men."

The title of the act, its preamble and provisions, would have been palpably absurd, if their object had been only or chiefly to found a great library. To describe a library as an institution "for the increase and diffusion of knowledge among men," would be a preposterous abuse of terms. So, too, "to erect a suitable building of sufficient size, with suitable rooms or halls for the reception and arrangement, upon a liberal scale, of objects of natural history, geological, mineralogical, and botanical specimens, classed and arranged so as to facilitate the study of them, with a chemical laboratory, lecture-rooms, &c.," as provided in sections 5 and 6, is wholly inconsistent with the idea of an institution of which a library is to be the principal agent.

It is true that the eighth section of the act authorizes an application of an annual sum, not exceeding $25,000, for the gradual formation of a library. This is in great disproportion to the various objects before recited in the act, and if it had been mandatory, would have made the general authority and discretion given to the Regents in the ninth section absurd and nugatory, and would indeed have equally defeated the other provisions before mentioned. Such an appropriation, if made, would establish a great library, but not such an institution as is indicated by the title of the bill, or warranted by its various provisions. Instead of a Secretary with assistants, it should have provided for a Librarian, with an assistant as secretary, and assistant librarians. Instead of providing for a building on a liberal scale, with suitable rooms or halls for a chemical laboratory, lecture-rooms, &c., not indicating the library as of paramount importance, but, according to the order of enumeration, placing it *after* other objects, the law would have declared it to be of primary importance, and designated the other objects as incidental or subsidiary to the library. The act, in its various terms and provisions, does not seem to have been the result of plans entirely harmonious and consistent, but bears some marks of conflicting opinions; and the large discretion allowed in the ninth section appears to have been intended to give to the Regents the authority to reconcile and determine those difficulties, which Congress could not avoid or provide for, to their own satisfaction.

Nothing, however, seems to be clearer than that the Legislature did not intend a public library to be the principal instrument of the Institution. The third section enacts that "the business of the Institution shall be conducted at the city of Washington by a Board of Regents." The terms of Smithson's will required that Washington should be the locality of the Institution; but if this section had reference to a public library, absorbing almost the whole interest of the fund, would

such language have been employed? If a library at Washington was to be established, it was wholly unnecessary to provide that the business of the Institution should be conducted there, since the business of a library must be conducted where it is placed. The use of this language would seem to imply active transactions and not to refer to books. The application of $25,000 annually (five-sixths of the whole income at the date of the act) to the purchase of books, would be inconsistent with and subversive of the whole tenor of all that precedes the eighth section. Section ninth is singularly comprehensive, and appears to indicate a consciousness, on the part of the framers of the bill, that its provisions might be proved by experience to be incongruous.

For this they provided the true remedy, by investing the Regents with full power to use their judgment in the premises, subject only to the purpose of the will of Smithson, and so much of the law as was mandatory and peremptory, "all other provisions to the contrary notwithstanding."

On the whole, therefore, the committee think that neither the law nor the will of Smithson required the Regents to consider a great library as the paramount object of the Institution.

Its purpose requires means of exciting and sustaining research, of stimulating and directing original inquiries, the results of which constitute an increase of knowledge, and the publication of which diffuses it.

Scientific researches are often supposed by the uninformed to be of little or no real importance, and indeed are frequently ridiculed as barren of all practical utility. But nothing is more mistaken than this. The most valuable and productive of the arts of life, the most important and wonder-working inventions of modern times, owe their being and value to scientific investigations. By these have been discovered physical truths and laws, the intelligent application of which to practical inventions has given immense benefits to the world. The germs of these valuable improvements and inventions have been found and developed by scientific research, the original forms of which have often seemed to the many to be as idle and useless as they were curious. A proposition relating to the pendulum, which for many years remained only a curious theoretical relation, ultimately furnished a unit for the standard measures of States and nations. The discovery that a magnetic needle could be moved by a galvanic current, seemed for a long time more curious than useful, and yet it contained the germ of all that was afterwards developed in the telegraph. It has been well remarked that numerous applications and inventions always result from the discovery of a scientific principle; so that there are many Fultons for every Franklin.

There is no branch of industrial art which does not owe for the most part its improved processes to such investigations, although the artisans who employ them are often ignorant of their true source. Smithson, who was himself a man of science and research, and a contributor to the philosophical transactions of the Royal Society, well knew this. The members of Congress who framed the law were not ignorant of it; and the provisions for a chemical laboratory, and collections of natural

history, proved that they looked to the prosecution of such inquiries under the auspicies of the Smithsonian Institution.

Wisely, therefore, did the first Board of Regents propose, in order to INCREASE KNOWLEDGE—

First. To stimulate men of talent to make original researches, by offering suitable rewards for memoirs containing new truths, and to publish these and such other papers of suitable character as should be offered to the Institution.

Second. To cause particular researches to be made by competent persons.

And in order to DIFFUSE KNOWLEDGE—

First. "To publish occasionally a series of practical reports on the progress of the different branches of knowledge."

Second. "To publish occasionally separate treatises on subjects of general interest."

The results which have been produced by the Institution have received the approbation of the learned in every part of the civilized world, and fully justify the wisdom of the plan adopted by the Regents, and successfully carried into operation by the Secretary.

As a proof of this, we need only state the following facts given in the last report of the Regents to Congress:

"The Institution has promoted astronomy, by the aid furnished the researches which led to the discovery of the true orbit of the new planet Neptune, and the determination of the perturbations of this planet, and the other bodies of the solar system, on account of their mutual attraction. It has also aided the same branch of science, by furnishing instruments and other facilities to the Chilian expedition, under Lieutenant Gillis; and by preparing and publishing an ephemeris of Neptune, which has been adopted by all the astronomers of the world.

"It has advanced geography, by providing the scientific traveller with annual lists of the occultations of the principal stars, by the moon, for the determination of longitude; by the preparation of tables for ascertaining heights with the barometer; and by the collection and publication of important facts relative to the topography of different parts of the country, particularly of the valley of the Mississippi.

"It has established an extended system of meteorology, consisting of a corps of several hundred intelligent observers, who are daily noting the phases of the weather in every part of the continent of North America. It has imported standard instruments, constructed hundreds of compared thermometers, barometers, and psychrometers, and has furnished improved tables and directions for observing with these instruments the various changes of the atmosphere, as to temperature, pressure, moisture, &c. It has collected, and is collecting, from its observers, an extended series of facts which are yielding deductions of great interest in regard to the climate of this country and the meteorology of the globe.

"The Institution has advanced the science of geology, by its researches and original publications. It has made a preliminary exploration of the remarkable region on the upper Missouri river called the Bad Lands, and is now printing a descriptive memoir on the extra-

ordinary remains which abound in that locality. It has assisted in explorations relative to the distribution in this country of the remains of microscopic animals found in immense quantities in different parts of the United States.

"It has made important contributions to botany, by means of the published results of explorations in Texas, New Mexico, and California; and by the preparation and publication of an extended memoir, illustrated with colored engravings, on the sea-plants of the coast of North America.

"It has published several important original papers on physiology, comparative anatomy, zoology, and different branches of descriptive natural history; and has prepared and printed, for distribution to travellers, a series of directions for collecting and preserving specimens.

"It has advanced terrestrial magnetism, by furnishing instruments for determining the elements of the magnetic force to various exploring expeditions; and by publishing the results of observations made under its direction at the expense of the government.

"It has collected and published the statistics of the libraries of the United States; and perfected a plan of stereotyping catalogues, which will render effective, as a combined whole, all the scattered libraries of the country.

"The Institution has also been instrumental in directing attention to American antiquities, and has awakened such an interest in the subject as will tend to the collection and study of all the facts which can be gathered relative to the ancient inhabitants of this continent. It has also rendered available, for the purposes of the ethnologist and philanthropist, the labors of our missionaries among the Dakotas, by publishing a volume on the language of this tribe of Indians; and has done good service to comparative philology by the distribution of directions for collecting Indian vocabularies.

"It has established an extended system of literary and scientific exchanges, both foreign and domestic, and annually transmits, between the most distant societies and individuals, hundreds of packages of valuable works. It has presented its own publications, free of expense, to all the first-class libraries of the world, and thus rendered them accessible, as far as possible, to all persons who are interested in their study. No restriction of copyright has been placed on their republication; and the truths which they contain are daily finding their way to the general public, through the labors of popular writers and teachers. The distribution of its publications and its system of exchanges has served not only to advance and diffuse knowledge, but also to increase the reputation, and consequently the influence, of our country; to promote a kindly and sympathetic feeling between the New World and the Old—alike grateful to the philosopher and the philanthropist.

"These are the fruits of what is called the system of active operations of the Institution, and its power to produce other and continuous results is only limited by the amount of the income which can be appropriated to it, since each succeeding year has presented new and important fields for its cultivation. All the anticipations indulged with regard to it have

been fully realized; and, after an experience of six years, there can now be no doubt of the true policy of the Regents in regard to it."

Reports of a more popular character have been published, or are in preparation, which are well calculated to diffuse knowledge. Such is the report on the recent improvements in the chemical arts, by Messrs. Booth & Morfit, prepared and published under the direction of the Institution. The Secretary has said of it, "that though chiefly intended to benefit the practical man, yet it will be found interesting to the general reader, as exhibiting the cotemporaneous advance of science and art, and the dependence of the latter upon the former for the improvement of its most important processes." Among the subjects of which it treats, may be mentioned fuel and furnaces, glass-making and pottery, cements, metals and their manufacture, chemicals, textile fabrics, mineral and organic manures. This work has been stereotyped, and besides those which are distributed on the plan of exchange, copies are offered for sale at the mere cost of printing, paper, and commission. Another report which is in preparation, on the forest trees of North America, giving their economical and ornamental uses and values, their history, mode of propagation, &c., &c., will supply to agriculturists a work of great interest and importance which has long been a desideratum. Other reports have been prepared, and will be ready for the press as soon as the funds can be appropriated for printing them.

The committee need not repeat in detail all the parts of the plan of organization, but may mention that it included the exchange of the published transactions of the Institution with those of literary and scientific societies and establishments, and provided for a museum and library, to consist of a complete collection of the transactions and proceedings of all the learned societies in the world, of the more important current periodical publications and of other works necessary to scientific investigations; thus employing the instrumentalities pointed out in the law, as means of increasing and diffusing knowledge, entirely consistent with, and necessary to, the plan of research and publication.

This plan is no longer experimental; it has been tested by experience; its success is acknowledged by all who are capable of forming a correct estimate of its results; and the Institution has every encouragement to pursue steadily its system of stimulating, assisting, and publishing research.

Whether the equal division of the income of the Institution, according to the plan of the compromise resolutions, should be observed after the completion of the building, is a question submitted to your committee for report, and proper to be decided by the Board during the present year. The committee think that while moderate appropriations should be annually made for the gradual increase of the library, and for other objects specified in the fifth section of the act establishing the Institution, so as to carry out in good faith the intention of Congress, it is not advisable to make the equal division of the income as proposed by the compromise resolutions.

The public generally, and even the Regents most probably, do not know how small the funds of the Institution are in proportion to what is required of it, and the expense necessarily connected with so large a building.

The Secretary has stated in his report that the general expenses—viz: meetings of the Regents and committees, lighting and heating of the building, postage, transportation, stationery, general printing, apparatus, incidentals, and general salaries—have gradually increased, and will grow larger when the building shall be completed and entirely occupied. Last year these expenses amounted to $12,000. Besides this, the salaries of the assistants and pay of attendants in the library and museum are $5,740 per annum.

The salaries are as follows:

General Salaries.

That of the Secretary (per annum)			$3,500
Clerk			1,000
Book-keeper			200
Janitor			400
Laborer			250
Watchman			365
			5,715
Salary of assistant in charge of the library	$2,500		
An assistant to the assistant in the library	600		
Another assistant	540		
		$3,640	
Salary of assistant in charge of the museum		2,000	
Assistance and labor in museum		100	
			5,740
Total of permanent salaries at the present time			11,455

Together, the salaries and general expenses before mentioned amount to more than half the interest of the original fund, and to nearly half of the interest on that fund, augmented by $150,000 of accumulated interest, which the Regents propose to add to it, so as to make the permanent fund $665,000. The whole or the greater part of the interest on this addition to the original fund will be required during the present year for the building, and, when that shall be finished, a considerable sum will be necessary to fit up and furnish the great central portion, which is to be chiefly occupied by the library and museum. It may be assumed that not less than $15,000 will be demanded for this purpose. But supposing the building to be completed and furnished, and the whole income at command for the operations of the Institution, and assuming that the salaries and general expenses will not increase, but remain as they were last year, at $17,740, there will be at the disposal of the Regents, for all operations and purposes, including lectures, researches, publications, purchase of books for the library, binding, explorations for the benefit of the museum, apparatus, and the purchase of objects of art, a sum between $22,000 and $23,000. It will readily be perceived how inadequate this sum is to the rapid accumulation of a library, of collections for the museum and gallery of art, for lectures and those active operations which lead directly to the increase and diffusion of knowledge. Even this fund may be expected to be diminished by the greater expense which will attend the occupation of the entire building and the increased and constantly-increasing collections.

The museum increases so rapidly by the deposit of government col-

lections, by donations, exchanges, and the receipt of specimens from special explorations aided by the Institution, that very small, if any, annual appropriations are required for it. But the expense of the care and exhibition of an increasing collection swells from year to year, while the Smithsonian funds are not so increased. The great object of the museum should be to furnish to men of science, eminent in their several departments, the means of advancing knowledge in these departments, by submitting specimens of new objects to their examination. If the expenditure could be borne, it would scarcely be desirable to increase the number of officers connected with the museum, so that the various branches of natural history might be fully represented; but considering the limited funds of the Smithsonian Institution, such an idea is not to be entertained.

On the contrary, the collections made should, in general, at all events, be referred for examination and description to the men most eminent in the country, and the results should be published in a manner worthy of their labors by the Institution.

A larger but still a moderate appropriation for the library, varying as circumstances may require, should be annually made. It may be desirable, occasionally, to make larger investments in books, as when a library of special value and peculiar suitableness may be in the market, and within the means of the Institution. But this should be left to the discretion and sound judgment of the Regents at the time.

It is not believed to be advisable to accumulate in the Smithsonian Institution great masses of books, without reference to their peculiar character and value. What we want, and what the act of Congress contemplates, is not a collection of everything which learned dullness and literary folly as well as real wisdom and sound science have put into print—a vast and unwieldly repertory, in which the trash as well as the precious may be found—but a library of *valuable* books pertaining to all departments of human knowledge. The exchanges will gradually furnish us with much that answers to this description, and moderate appropriations will supply, quite as rapidly as necessary, whatever besides may be requisite to constitute a valuable library of research in all departments of human knowledge. The library now consists of 12,005 volumes, besides 8,095 pamphlets and parts of volumes, and 1,874 maps, and 1,431 engravings.

In his report to the Secretary, of January, 1853, Professor Jewett stated that the library had nearly doubled in size during the year 1852, and that its greatest increase had been by exchanges. He said "they may be considered as the first fruits of a system of scientific and literary exchange established and sustained by the Institution. They show, also, that the benefits derivable from its connexion with the system of active operations had not been over-estimated.

"A considerable portion of the money expended in publications returns in the shape of books for the library. These again are constantly increasing the efficiency and interest of the publications. The value of the books received by exchange cannot be estimated by their number, or even their nominal price.

"They are works of the first importance to the scientific student

and which it is very difficult to procure by purchase, even with large funds at command."

Professor Baird estimated the value of the works thus received, during the year 1852, at from $4,000 to $5,000. If we estimate the future receipts from the system of exchange at half that sum annually, and suppose an appropriation in money of equal amount for the purchase of books, the growth of the library will be quite as rapid as was that of the library of Congress during the twenty-five years prior to the late fire, and its annual increase in value more than double that of the Congressional Library before the period mentioned. For several years before 1825, the ordinary appropriations of Congress for their library were not more than $2,000 per annum. Since that period they have been $5,000.

The Committee of Organization, in their report submitted in 1847, recommended such a selection of books as would "make the Smithsonian Library chiefly a supplemental one." and "to purchase for the most part valuable works which are not to be found elsewhere in the Union."

Of course this was not to be a universal rule, and not to exclude standard works of authority and reference. They particularly desired to see the library so supplied with important works on bibliography, so that it might become the centre of literary and bibliographical reference for the whole country. This desire has always been entertained by the Regents, and much has already been done towards this object. The collection of printed and manuscript catalogues has already been commenced with this view, and should be steadily followed up. It is believed that the appropriations suggested, together with the exchanges and occasional special appropriations, will, in a reasonable time, not only secure this object, but make the library the most important collection of valuable books, pertaining to all departments of knowledge, to be found in our country.

Suggestions have been made to the committee of certain alterations, in the organization of the Institution, which your committee think not warranted by the letter and spirit of the law, and in conflict with the seventh section, which defines the duties and powers of the Secretary. That section admits of only one interpretation. Its terms are direct and explicit, and its objects are expressly and pointedly set forth. The entire property of the Institution is placed by it in the Secretary's hands, and he is distinctly constituted the responsible agent of the Board of Regents. He is "to make a fair and accurate record of all their proceedings," "to take charge of the building and property of the Institution," to discharge the duties of librarian and keeper of the museum. This language clearly shows the intention of the framers of the law to secure unity of action, to admit of no separate and independent departments, as is often the case in other institutions. All the duties enumerated are devolved solely on the Secretary, and though other persons may be employed, they are merely *his* assistants, the offices being emphatically one. The Secretary alone is authorized to act; and if the business of the Institution demanded no more than the mind and labor of one man might be competent to perform, there would be no occasion for the employment of any one else.

The law is declaratory and positive in charging the Secretary with the enumerated duties, and therefore invests him, and him alone, with the corresponding powers. But as it must have been manifest that no Secretary could be able of himself to perform personally everything required for the discharge of his enumerated duties, provision is made for aid to him, in the clause which says that he "may, with the consent of the Board, employ assistants," &c.

The positions of the persons so employed are determined by the word which designates them in the clause authorizing their employment. They are called "*assistants*." To whom? Not to the Regents, but to the Secretary. Their position is necessarily subordinate; and as their duties are those of assistants to their principal, they can no more be independent of him than they can be superior to him. This construction is so manifestly proper, that it would seem to require no argument to justify it. But if anything further were wanted, it may be found in the fact that the *Secretary* is to employ them in and about that very business with which *he* is charged and for which *he* alone is responsible. The character of this part of the section is permissive. He is not *required* to employ any one, but is permitted to employ persons to assist him, provided he satisfy the Board that their services are necessary as aids to him.

In another part of the same section provision is made for the payment, and if need be the removal, of the Secretary and his assistants, and in this connexion they are spoken of as officers; but by no ingenuity of construction can that word, in this connexion, be held to assign them special duties or confer any separate authority.

Thus careful has Congress been to provide an efficient system of operations which can only come from harmony of purpose and unity of action.

This view of the intention of Congress, so clearly expressed in the law, would be directly contradicted by the plan which has been suggested, of organizing the Institution definitely into several departments, placing at the head of these departments different assistants, establishing their relative positions, prescribing distinct duties for them, assigning certain shares of the income to be disbursed by them, and stating their authority, privileges, and remedies for infringement of their official rights, or of the interests intrusted to their care. All this would tend not to secure a loyal and harmonious co-operation, to a common end, of the assistants with the Secretary, but to encourage rivalry, to invite collision, to engender hostility, to destroy subordination, to distract the operations of the Institution, to impair its efficiency, and to destroy its usefulness.

The committee are satisfied, too, that the expenditures of the Institution would be unprofitably increased by organizing it into several departments, with authority to the head of each department to expend the money appropriated to it. The tendency would be to more subdivisions of duty, to an increase of assistants, by the introduction first of temporary and then of permanent employés, until, as the collections grew larger and the persons charged with their care became more numerous, the greater portion of the income would be absorbed in salaries. Thus the munificence intended to increase and diffuse knowledge

among mankind would be chiefly expended in salaries and official emoluments.

Already the committee think it would be well to consider whether it might not be consistent with the proper working of the Institution to limit and reduce some of these expenses.

While the committee desire to preserve and increase the library and museum, as already stated, they think it would be well to repeal the seventh resolution, passed by the Board of Regents on the 26th January, 1847, which has already been recited.

They recommend that in future the appropriations should be made without reference to any fixed rule of distribution or division between the different operations and objects of the Institution, and that the Board, while making specific appropriations, should apportion them according to their opinion of what is necessary and proper, giving to each object such sum as its intrinsic importance and a compliance in good faith with the law may seem to demand.

Thus they will be enabled to economize by postponing or limiting some operations and preferring others, by applying the funds to those objects which at the time appear most pressing, and which promise the most prompt, far-reaching, and beneficial action.

In conclusion, the committee adopt the following remarks and recommendations, which they extract from a paper submitted to them by the Secretary, and desire that they may be considered as part of this report:

"If one-fourth of the whole income is devoted to the museum, additional assistants will be required for the care and management of the specimens, while the withdrawal of Prof. Baird from the publications and exchanges will require more help in that quarter.

"Besides the necessary expenditure for cases and furniture for the library, appropriations may be made for carrying on the catalogue system; for printing reports on libraries; for the publication of a library manual; for the preparation and publication of bibliographies; for completing sets of transactions, and the purchase of other books for the operations of the Institution; also, for printing a catalogue or list of books in the library.

"In addition to the sum which will be necessarily required for the cases and furniture of the museum, a small sum may annually be appropriated for collecting particular desiderata in natural history, to be presented to other institutions as well as preserved in this; for purchasing instruments and models to illustrate particular branches of knowledge, or to assist in the prosecution of special lines of research, which may serve as samples to artisans in this country, or be used in investigations.

"Models may also be obtained for multiplying casts of the most celebrated specimens of ancient and modern art.

"Appropriations for all these objects cannot be made in the same year, but discretion, as I have said before, should be used as to the time when it would be the most advisable to make the expenditure in each particular case.

"As few operations as possible ought to be carried on in the building of the Institution. Printing, stereotyping, engraving, &c., can be

done at a cheaper rate by contract; these require expensive superintendence; and workmen, as a general rule, cannot be expected to do as much for public institutions as for a private individual. Besides this, much time must be lost in the interval of the publication of the different articles; and when it is necessary, on account of the exhaustion of the appropriation, to stop for the year, this can only be done by disbanding the workmen, while the interest on the cost of the apparatus remains.

"These remarks also apply to calculations and reductions of observations, which, in many cases, can be distributed to professors in colleges, who, for a small addition to their salaries, will furnish results which could not be procured in the Institution for many times the same sum.

"The maxim stated in the programme, namely, that few individuals ought to be permanently supported by the Institution, should be constantly kept in view, and the greatest caution exercised in adding new members to the permanent corps.

"The Institution, in order to produce the greatest amount of useful effect with a given expenditure of income, must be a unit in plan and a unit in purpose. Each assistant must not merely have regard to the advancement of his own speciality, but the good of the whole; and though he may be assigned a specific duty, he should be ready and willing, at the call of the Secretary, to render service in any other. Without a system of government which will insure this, not only the usefulness of the Institution will be greatly abridged, but its very existence jeoparded."

The committee submit to the Board the following resolutions:

Resolved, That the seventh resolution, passed by the Board of Regents on the 26th of January, 1847, requiring an equal division of the income between the active operations and the museum and library, when the buildings are completed, be and it is hereby repealed.

Resolved, That hereafter the annual appropriations shall be apportioned specifically among the different objects and operations of the Institution, in such manner as may, in the judgment of the Regents, be necessary and proper for each, according to its intrinsic importance, and a compliance in good faith with the law.

Respectfully submitted.

JAMES A. PEARCE,
Chairman.

Mr. Mason offered the following resolution, which was adopted:

Resolved, That the report of the Special Committee just made be laid on the table for further consideration, and that the papers referred to in the report be communicated to the Board for their examination; and that said report, and such report of a minority of the committee as may be made in the recess of the Board, be printed.

On motion of Mr. English, the Board then adjourned, to meet on Saturday, the 8th of July, at 10 o'clock a. m.

WASHINGTON, *July* 8, 1854.

An adjourned meeting of the Board of Regents was held on Saturday, July 8, at 10 o'clock a. m.

Present: Messrs. Bache, Douglas, English, Hawley, Mason, Pearce, Rush, Stuart, Totten. Towers, and the Secretary.

In the absence of the Chancellor, Mr. Hawley was called to the chair.

John T. Towers, esquire, mayor elect of the city of Washington, appeared and took the seat in the Board vacated by Mr. Maury, late mayor.

The Secretary laid before the Board the sixth volume of Smithsonian Contributions to Knowledge.

Mr. Mason, from the Select Committee on the resolutions of Messrs. Fitch and Meacham, offered the following resolution:

"The Secretary of the Institution and of this Board is, by the seventh section of the act 'to establish the Smithsonian Institution,' required to discharge the duties of 'librarian and keeper of the museum,' having, with the consent of the Board of Regents, power to employ assistants, the better to enable him to discharge those duties; for a better construction whereof,

Be it resolved, That whilst power is reserved in the said section to the Board of Regents to remove both the Secretary and his assistants, in the opinion of the Board, power, nevertheless, remains with the Secretary to remove his said assistants."

Mr. English moved to amend the resolution by inserting the words "*with the consent of the Board of Regents*," after the words "power, nevertheless, remains with the *Secretary*."

Mr. Stuart moved that the consideration of Mr. Mason's resolution be postponed till the next meeting of the Board. On this question the yeas and nays were demanded.

Those voting in the affirmative:

YEAS.—Messrs. Douglas, English, Stuart, Towers—4.

NAYS.—Messrs. Bache, Hawley, Mason, Pearce, Totten—5.

So the motion was not carried.

The question was then taken on the amendment offered by Mr. English to Mr. Mason's resolution, and the yeas and nays taken:

YEAS.—Messrs. Douglas, English, Stuart, Towers—4.

NAYS.—Messrs. Bache, Hawley, Mason, Pearce, Totten—5.

So the amendment was lost.

Mr. Douglas moved a postponement of the subject for a week from next Friday.

The yeas and nays were taken on this motion:

YEAS.—Messrs. Douglas, English, Stuart, Towers—4.

NAYS.—Messrs. Bache, Hawley, Mason, Pearce, Totten—5.

So the motion was lost.

The question was then taken on Mr. Mason's resolution; which was adopted.

YEAS.—Messrs. Bache, Hawley, Mason, Pearce, Rush, Totten—6.

NAYS.—Messrs. Douglas, English, Stuart, Towers—4.

Mr. Stuart moved to postpone the consideration of the resolutions

appended to the report of the Select Committee on the resolutions of Messrs. Fitch and Meacham till the next annual session.

A division was called for—ayes 3, noes 6.

So the motion was lost.

Mr. Douglas moved to postpone the consideration for two weeks.

A division was called for—ayes 4, noes 6.

So the motion was lost.

Mr. English moved that the Board adjourn.

This motion was withdrawn to allow the chairman of the Executive Committee, Mr. Pearce, to bring forward the appropriations for the year recommended by the committee, and reported to the Board, April 29, 1854.

On motion, the appropriations, as reported by the Executive Committee, were adopted—ayes 7, noes 3.

The Secretary stated to the Board that he had employed Mr. Lorin Blodget to reduce and discuss the meteorological observations collected by the Smithsonian Institution, and that some misunderstanding had arisen between this gentleman and himself as to the adjustment of his claims in reference to the work, which he proposed to refer to the Executive Committee, and if necessary to a Commission of Examination, one of whom might be appointed by the Secretary, another by Mr. Blodget, and a third by the two persons so appointed ; whereupon,

On motion of Mr. Mason, it was

Resolved, That the Executive Committee be authorized to investigate and settle the business presented to the Board by the Secretary.

Mr. English then renewed his motion to adjourn.

Adopted—ayes 6, noes 4.

The Board then adjourned *sine die*.

PROCEEDINGS OF THE ESTABLISHMENT.

WASHINGTON, *May* 3, 1853.

A meeting of the Smithsonian Institution, called by order of the President of the United States, was held this day, May 3, 1853, in the session-hall of the Smithsonian building, at 11 o'clock a. m.

Present: Franklin Pierce, President of the United States, *ex officio* President of the Smithsonian Institution; James Guthrie, Secretary of the Treasury; James C. Dobbin, Secretary of the Navy; James Campbell, Postmaster General; Caleb Cushing, Attorney General; John W. Maury, Mayor of Washington; Joseph Henry, Secretary of the Smithsonian Institution.

The Secretary gave an account of the operations of the Institution.

Less than half of the number of members being present, the meeting adjourned to meet on Tuesday, the 17th instant.

WASHINGTON, *May* 17, 1853.

An adjourned meeting of the Smithsonian Institution was held this day in the session-hall of the Smithsonian building.

Present: Franklin Pierce, President of the United States; William L. Marcy, Secretary of State; James Guthrie, Secretary of the Treasury; Jefferson Davis, Secretary of War; James C. Dobbin, Secretary of the Navy; James Campbell, Postmaster General; Caleb Cushing, Attorney General; Charles Mason, Commissioner of Patents; John W. Maury, Mayor of Washington; Joseph Henry, Secretary of the Smithsonian Institution.

The President took the chair, and the minutes of the preceding meeting were read.

On motion, the President appointed a committee of five to draft a code of by-laws. The committee consisted of the following persons, to wit: Messrs. Cushing, Dobbin, Maury, Davis, and the Secretary.

The committee, after due deliberation, reported through their chairman, Mr. Cushing, the following:

BY-LAWS OF THE SMITHSONIAN INSTITUTION.

SEC. 1. A stated annual meeting of the statute and honorary members of the Institution shall be held at the hall of the Institution, in Washington, on the first Tuesday in May. Adjourned meetings may be held at such place and time as the members of the Institution at any meeting may order. Special meetings will be convened by direction of the President of the United States.

SEC. 2. Notice of all meetings of the Institution, whether stated, adjourned, or special, shall be given by the Secretary in writing, addressed to each member.

SEC. 3. The votes and proceedings of the Institution, with the names of the members present at each meeting, shall be recorded; and at the opening of every meeting the journal of the preceding meeting shall be read by the Secretary.

SEC. 4. A quorum of not less than six of the statute members shall be requisite for the transaction of any business except adjourning or obtaining the attendance of members.

SEC. 5. The Secretary shall, at the stated annual meeting, make a general statement of the condition and affairs of the Institution during the past year.

SEC. 6. Honorary members, not exceeding one in each year, shall be elected by ballot, and by unanimous vote of the statute members: *Provided*, That no person shall be chosen without having been nominated at a previous meeting of the Institution.

SEC. 7. The rules of parliamentary proceedings, as received and practised in the Senate of the United States, shall govern the meetings of the Institution in all cases which are not inconsistent with the foregoing by-laws.

On motion, the report of the committee was adopted.

The Secretary presented an account of the organization and operations of the Institution relative to the reception and publication of memoirs, researches, exchanges, the formation of catalogues of libraries; also, an account of the state of the funds, and the policy with regard to the formation of collections, &c.

On motion of Mr. Davis, nominations were then received for the appointment of an honorary member of the Institution, to take place at a succeeding meeting.

On motion, the Institution adjourned to the first Monday in June ensuing, at 11 o'clock a. m.

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WASHINGTON, *June* 6, 1853.

An adjourned meeting of the Smithsonian Institution was held this day, June 6, 1853, in the session hall of the Smithsonian building.

Present: Franklin Pierce, President of the United States, *ex officio* President of the Smithsonian Institution; James Guthrie, Secretary of the Treasury; William L. Marcy, Secretary of State; Jefferson Davis, Secretary of War; James Campbell, Postmaster General; Caleb Cushing, Attorney General; Charles Mason, Commissioner of Patents; Joseph Henry, Secretary of the Smithsonian Institution.

The President took the chair, and the minutes of the preceding meeting were read.

On motion, the Institution proceeded to ballot for the election of an honorary member.

Professor Parker Cleaveland was declared unanimously elected.

The advertisement of the Leopoldin Caroline Academy of Germany, relative to the Smithsonian Institution, was read by the Secretary.

The Institution then adjourned *sine die*.

The stated annual meeting of the Smithsonian Institution was held this day, May 2, 1854, at the hall of the Institution, at 12 o'clock m.

Present: Franklin Pierce, President of the United States; Hon. Wm. L. Marcy, Secretary of State; Hon. James Guthrie, Secretary of the Treasury; Hon. Jefferson Davis, Secretary of War; Hon. James C. Dobbin, Secretary of the Navy; Hon. Caleb Cushing, Attorney General; Hon. John W. Maury, Mayor of the city; Professor Robert Hare, honorary member; Professor Joseph Henry, Secretary of the Institution.

The President took the chair.

The minutes of the last annual meeting were read and approved.

On motion of Hon. Mr. Guthrie, the Institution proceeded to nominate candidates for election as honorary members.

Dr. Hare made some remarks respecting his apparatus, and the conditions on which it was presented to the Institution.

The Secretary explained the cause of the delay in completing the repairs, and in the proposed exhibition of the apparatus. This had been mainly due to an accident which happened to the building. A part of the interior gave way, and the Regents directed that the whole wood-work of the main building should be removed, and its place supplied with fire-proof materials. To meet the additional expense of this necessary change in the plan, the time of completing the edifice was extended, and funds which would have been devoted to other purposes were consequently given to this object. The building will, however, be completed in the course of the present year; a spacious room is now nearly ready to receive the apparatus, and due diligence on the part of the Institution will be made to finish the repairs of the articles, of which a considerable portion are now completed.

On motion, the Institution then adjourned to the first Tuesday in June next, (6th proximo.)

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WASHINGTON, *June* 6, 1854.

An adjourned meeting of the Smithsonian Institution was held this day, June 6, 1854, in the hall of the Institution, at 12 o'clock m.

Present: Hon. William L. Marcy, Secretary of State; Hon. James Guthrie, Secretary of the Treasury; Hon. Caleb Cushing, Attorney General; Hon. Charles Mason, Commissioner of Patents; Professor Joseph Henry, Secretary of the Institution.

There not being a legal quorum present, on motion of Mr. Cushing, the Institution adjourned to meet on Saturday, July 15, 1854, at 12 o'clock m.

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WASHINGTON, *July* 15, 1854.

An adjourned meeting of the Smithsonian Institution was held this day, July 15, 1854, in the hall of the Institution, at 12 o'clock m.

Present: Franklin Pierce, President of the United States; Hon. William L. Marcy, Secretary of State; Hon. James Guthrie, Secretary of

the Treasury; Hon. Jefferson Davis, Secretary of War; Hon. James C. Dobbin, Secretary of the Navy; Hon. James Campbell, Postmaster General; Hon. Caleb Cushing, Attorney General; Hon. Charles Mason, Commissioner of Patents.

The President took the chair. The minutes of the last meeting were read and approved.

The nominations previously made for honorary members were then read, and the Institution proceeded to ballot, but no choice was made.

On the second ballot no choice was made.

On motion, the election of an honorary member was postponed.

Ordered, That three persons be appointed a committee of the Institution to confer with the Board of Regents as to suitable means of communication between the two bodies, and to report thereon at a subsequent meeting of the Institution.

The Secretary gave a general account of the affairs of the Institution; the condition of the building; the operations carried on during the past year; and a statement of the finances at the present time.

The President appointed Messrs. Cushing, Davis, and Mason, as the committee of conference with the Board of Regents.

On motion of Mr. Campbell, the Institution adjourned to meet on the third Saturday (21st) of October next.

APPENDIX.

WILL OF SMITHSON.

I, James Smithson, son of Hugh, first Duke of Northumberland, and Elizabeth, heiress of the Hungerfords of Audley, and niece of Charles the Proud, Duke of Somerset, now residing in Bentinck street, Cavendish square, do this 23d day of October, 1826, make this my last will and testament:

I bequeath the whole of my property, of every nature and kind soever, to my bankers, Messrs. Drummonds, of Charing Cross, in trust, to be disposed of in the following manner, and desire of my said executors to put my property under the management of the court of chancery:

To John Fitall, formerly my servant, but now employed in the London docks, and residing at No. 27 Jubilee Place, North Mile End, Old Town, in consideration of his attachment and fidelity to me, and the long and great care he has taken of my effects, and my having done but very little for him, I give and bequeath the annuity or annual sum of £100 sterling for his life, to be paid to him quarterly, free from legacy duty and all other deductions; the first payment to be made to him at the expiration of three months after my death. I have at divers times lent sums of money to Henry Honori Juilly, formerly my servant, but now keeping the Hungerford Hotel, in the Rue Caumartin, at Paris, and for which sums of money I have undated bills or bonds signed by him. Now I will and direct that, if he desires it, these sums of money be let remain in his hands at an interest of five per cent. for five years after the date of the present will.

To Henry James Hungerford, my nephew, heretofore called Henry James Dickinson, son of my late brother, Lieutenant Colonel Henry Louis Dickinson, now residing with Mr. Auboin, at Bourg la Reine, near Paris, I give and bequeath for his life the whole of the income arising from my property, of every nature and kind whatever, after the payment of the above annuity, and, after the death of John Fitall, that annuity likewise, the payments to be at the time the interest or dividends become due on the stocks or other property from which the income arises.

Should the said Henry James Hungerford have a child or children, legitimate or illegitimate, I leave to such child or children, his or their heirs, executors, and assigns, after the death of his, her, or their father, the whole of my property of every kind, absolutely and forever, to be divided between them, if there is more than one, in the manner their father shall judge proper, and in case of his omitting to decide this, as the Lord Chancellor shall judge proper.

Should my nephew, Henry James Hungerford, marry, I empower him to make a jointure.

In case of the death of my said nephew without leaving a child or children, or of the death of the child or children he may have had,

under the age of 21 years, or intestate, I then bequeath the whole of my property, subject to the annuity of £100 to John Fitall, and for the security and payment of which I mean stock to remain in this country, to the United States of America, to found at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men.

I think it proper here to state, that all the money which will be standing in the French five per cents. at my death in the name of the father of my above-mentioned nephew, Henry James Hungerford, and all that in my name, is the property of my said nephew, being what he inherited from his father, or what I have laid up for him from the savings upon his income.

JAMES SMITHSON. [L. S.]

Extract from a letter from Hon. Richard Rush to Hon. John Forsyth, Secretary of State.

LONDON, *May* 12, 1838.

* * * * * * * *

"I have made inquiries, from time to time, in the hope of finding out something of the man, personally a stranger to our people, who has sought to benefit distant ages by founding, in the capital of the American Union, an Institution (to describe it in his own simple and comprehensive language) for the increase and diffusion of knowledge among men. I have not heard a great deal. What I have heard, and may confide in, amounts to this: That he was, in fact, the natural son of the Duke of Northumberland; that his mother was a Mrs. Macie, of an ancient family in Wiltshire of the name of Hungerford; that he was educated at Oxford, where he took an honorary degree in 1786; that he went under the name of James Lewis Macie until a few years after he had left the university, when he took that of Smithson, ever after signing only James Smithson, as in his will; that he does not appear to have had any fixed home, living in lodgings when in London, and occasionally staying a year or two at a time in cities on the continent, as Paris, Berlin, Florence, Genoa, at which last he died; and that the ample provision made for him by the Duke of Northumberland, with retired and simple habits, enabled him to accumulate the fortune which now passes to the United States. I have inquired if his political opinions or bias were supposed to be of a nature that led him to select the United States as the great trustee of his enlarged and philanthropic views. The reply has been, that his opinions, as far as known or inferred, were thought to favor monarchical rather than popular institutions; but that he interested himself little in questions of government, being devoted to science, and chiefly chemistry; that this had introduced him to the society of Cavendish, Wollaston, and others advantageously known to the Royal Society in London, of which body he was a member, and to the archives of which he made contributions; and that he also became acquainted, through his visits to the continent, with eminent chemists in France, Italy, and Germany.

Finally, that he was a gentleman of feeble health, but always of courteous though reserved manners and conversation.

"Such I learn to have been some of the characteristics of the man whom generations to come may see cause to bless, and whose will may enrol his name with the benefactors of mankind."

NOTICE OF SMITHSON BY THE PRESIDENT OF THE ROYAL SOCIETY.

November 30, 1829.—Davies Gilbert, esq., President of the *Royal Society*, in his address to the society, mentions the death of Mr. Smithson as having occurred during the preceding year, or since the last annual meeting of the society, and remarks as follows:

"Mr. Smithson has added eight (8) communications to our transactions. He was distinguished by the intimate friendship of Mr. Cavendish, and rivalled our most expert chemists in elegant analyses; but the latter part of his life has been passed abroad."—(See Philosophical Magazine, 2d series, vol. 7, p. 42.)

And again, in his address to the *Royal Society*, *November* 30, 1830, Mr. Gilbert, in speaking of Mr. Smithson, says:

"Of this gentleman I must be allowed to speak with affection. We were at Oxford together, of the same college, and our acquaintance continued to the time of his decease. Mr. Smithson, then called Macie, and an under graduate, had the reputation of excelling all other resident members of the university in the knowledge of chemistry. He was early honored by an intimate acquaintance with Mr. Cavendish; he was admitted into the Royal Society, *and soon after presented a paper on* the very curious concretion frequently found in the hollow of bambû canes, named *Tabasheer*. This he found to consist almost entirely of silex, existing in a manner similar to what Davy long afterwards discovered in the epidermis of reeds and grasses. Mr. Smithson enriched our transactions with seven other communications: a chemical analysis of some calamines; account of a discovery of native minium; on the composition and crystalization of certain sulphurets from Huel Boys, in Cornwall; on the composition of zeolite; on a substance procured from the elm tree called ulmine; on a saline substance from Mount Vesuvius; facts relative to the coloring matter of vegetables.

"He was the friend of Dr. Wollaston, and at the same time his rival in the manipulation and analysis of small quantities. Mr. Smithson frequently repeated an occurrence with much pleasure and exultation as exceeding anything that could be brought into competition with it, and this must apologize for my introducing what might otherwise be deemed an anecdote too light and trifling on such an occasion as the present.

"Mr. Smithson declared, that happening to observe a tear gliding down a lady's cheek, he endeavored to catch it on a crystal vessel, that one-half of the drop escaped, but having preserved the other half, he submitted it to re-agents, and detected what was then called microcosmic salt, with muriate of soda, and, I think, three or four more saline substances, held in solution.

"For many years past Mr. Smithson has resided abroad, principally, I believe, on account of his health; but he carried with him the esteem and regard of various private friends, and of a still larger number of persons who appreciated and admired his acquirements."—(See Philosophical Magazine, 2d series, vol. ix, p. 41.)

LIST OF PAPERS PRESENTED TO THE ROYAL SOCIETY BY JAMES SMITHSON.

1. "An Account of some Chemical Experiments on Tabasheer." Read July 7, 1791. By James Louis Macie, esq., F. R. S.—Philosophical Transactions, vol. 81, p. 368.
2. "A Chemical Analysis of some Calamines." Read November 18, 1802.—Philosophical Transactions, vol. 93, p. 12, and P. Magazine, vol. 14, p. 173.
3. "An Account of a Discovery of Native Minium." Read April 24, 1806.—Philosophical Transactions, vol. 96, p. 267, and P. Magazine, vol. 24, p. 274, and vol. 26, p. 114.
4. "On Quadruple and Binary Compounds, particularly Sulphurets." Read December 24, 1807, but not published in the P. Transactions.—Philosophical Magazine, vol. 29, p. 275.
5. "On the Composition of the Compound Sulphuret from Huel Boys, and an account of its Crystals." Read January 28, 1808.—Philosophical Transactions, vol. 98, p. 55, and P. Magazine, vol. 29, p. 275.
6. "On the Composition of Zeolite." Read February 7, 1811.—Philosophical Transactions, vol. 101, p. 171, and P. Magazine, vol. 37, p. 152, and vol. 38, p. 30.
7. "On a Substance from the Elm Tree, called Ulmine." Read December 10, 1812.—Philosophical Transactions, vol. 103, p. 64, and P. Magazine, vol. 42, p. 204.
8. "On a Saline Substance from Mount Vesuvius." Read July 8, 1813.—Philosophical Transactions, vol. 103, p. 256, and P. Magazine, vol. 42, p. 425.
9. "A few Facts relative to the Coloring Matter of some Vegetables." Read December 18, 1817.—Philosophical Transactions, vol. 108, p. 110, and P. Magazine, vol. 57, p. 58.

CONTRIBUTIONS TO THE "ANNALS OF PHILOSOPHY," BY JAMES SMITHSON.

1. "On a Native Compound of Sulphuret of Lead and Arsenic."—Paris, May 19, 1819; vol. 14, p. 96, 1819; and see vol. 16, p. 100.
2. "On Native Hydrous Aluminate of Lead, or Plomb Gomme.—Paris, May 28, 1819; vol. 14, p. 31, 1819; and see vol. 16, p. 100.
3. "On a Fibrous Metallic Copper." Paris, March 17, 1820; vol. 16, p. 46, 1820.

4. "An Account of a Native Combination of Sulphate of Barium and Fluoride of Calcium."—Paris, March 24, 1820; vol. 16, p. 48, 1820; and see vol. 16, p. 100, for notices of 1 and 2, above.

5. "On some Capillary Metallic Tin forced through the Pores of Cast-iron."—Paris, February 17, 1821, vol. 17; new series, vol. 1, p. 271, 1821.

6. "On the Detection of very Minute Quantities of Arsenic and Mercury."—Letter from Mr. Smithson, (not dated,) vol. 20; new series, vol. 4, p. 127, 1822.

7. "On some Improvements of Lamps."—Vol. 20, p. 363; new series, vol. 4, p. 127, 1822; and see Ann. de Chemie., vol. xli, p. 92, and Journal of Science and Art, vol. 28, p. 183.

8. "On the Crystaline Form of Ice." March 4, 1823.—Vol. 21; new series, vol. 5, p. 340, 1823.

9. "A Means of discriminating between Sulphate of Barium and Strontium." April 2, 1823.—Vol. 21; new series, vol. 5, p. 359, 1823.

10. "On the Discovery of Acids in Mineral Substances." April 12, 1823.—Vol. 21; new series, vol. 5, p. 384, 1823.

11. "An Improved way of Making Coffee." June 4, 1823.—Vol. 22; new series, vol. 6, p. 30, 1823.

12. "A Discovery of Chloride of Potassium in the Earth." (Not dated.)—Vol. 22; new series, vol. 6, p. 258, 1823.

13. "A Method of Fixing Particles on the Sappare." October 24, 1823.—Vol. 22; new series, vol. 6, p. 412, 1823.

14. "On some Compounds of Fluorine." January 2, 1824.—Vol. 23; new series, vol. 7, p. 100, 1824.

15. "An Examination of some Egyptian Colors." January 2, 1824. Vol. 23; new series, vol. 7, p. 115, 1824.

16. "Some Observations on Mr. Penn's theory concerning the formation of the Kirkdale Cave." June 10, 1824.—Vol. 24; new series, vol. 8, p. 50, 1824.

17. "A Note on a Letter from Dr. Black, describing a very Sensible Balance."—Vol. 26; new series, vol. 10, p. 52, 1825.

18. "A Method of Fixing Crayon Colors." London, August 23, 1825.—Vol. 26; new series, vol. 10, p. 236, 1825.

ACT OF CONGRESS ACCEPTING BEQUEST.

AN ACT to authorize and enable the President to assert and prosecute, with effect, the claim of the United States to the legacy bequeathed to them by James Smithson, late of London, deceased, to found at Washington, under the name of the Smithsonian Institution, an Establishment for the Increase and Diffusion of Knowledge among Men.

SEC. 1. *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the President of the United States be, and he is hereby, authorized to constitute and appoint an agent or agents, to assert and prosecute for and in behalf of the United States, and in their name or otherwise, as may be advisable, in the court of chancery, or other proper tribunal of England, the right of the United States to the legacy bequeathed to them by the last will

and testament of James Smithson, late of London, deceased, for the purpose of founding at Washington, under the name of the Smithsonian Institution, an Establishment for the Increase and Diffusion of Knowledge among Men; and to empower such agent or agents so appointed to receive and grant acquittances for all such sum or sums of money, or other funds, as may or shall be decreed or adjudged to the United States for or on account of said legacy.

SEC. 2. *And be it further enacted*, That the said agent or agents shall, before receiving any part of said legacy, give a bond or bonds, in the penal sum of five hundred thousand dollars, to the Treasurer of the United States and his successors in office, with good and sufficient securities to the satisfaction of the Secretary of the Treasury for the faithful performance of the duties of the said agency, and for the faithful remittance to the Treasurer of the United States of all and every sum or sums of money or other funds which he or they may receive for payment in whole or in part of the said legacy. And the Treasurer of the United States is hereby authorized and required to keep safely all sums of money or other funds which may be received by him in virtue of the said bequest, and to account therefor separately from all other accounts of his office, and subject to such further disposal thereof as may be hereafter provided by Congress.

SEC. 3. *And be it further enacted*, That any and all sums of money and other funds which shall be received for or on account of the said legacy shall be applied, in such manner as Congress may hereafter direct, to the purpose of founding and endowing at Washington, under the name of the Smithsonian Institution, an Establishment for the Increase and Diffusion of Knowledge among Men, to which application of the said moneys and other funds the faith of the United States is hereby pledged.

SEC. 4. *And be it further enacted*, That, to the end that the claim to the said bequest may be prosecuted with effect, and the necessary expenses in prosecuting the same be defrayed, the President of the United States be, and he is hereby, authorized to apply to that purpose any sum not exceeding ten thousand dollars out of any moneys in the treasury not otherwise appropriated.

Approved July 1, 1836.

AN ACT TO ESTABLISH THE SMITHSONIAN INSTITUTION.

AN ACT to establish the "Smithsonian Institution," for the Increase and Diffusion of Knowledge among Men.

James Smithson, esquire, of London, in the kingdom of Great Britain, having by his last will and testament given the whole of his property to the United States of America, to found at Washington, under the name of the Smithsonian Institution, an Establishment for the Increase and Diffusion of Knowledge among Men; and the United States having, by an act of Congress, received said property. and accepted said trust; therefore, for the faithful execution of said trust according to the will of the liberal and enlightened donor—

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the President and Vice President of the United States, the Secretary of State, the Secretary of

the Treasury, the Secretary of War, the Secretary of the Navy, the Postmaster General, the Attorney General, the Chief Justice, and the Commissioner of the Patent Office of the United States, and the Mayor of the city of Washington, during the time for which they shall hold their respective offices, and such other persons as they may elect honorary members, be, and they are hereby, constituted an "Establishment," by the name of the "Smithsonian Institution," for the Increase and Diffusion of Knowledge among Men; and by that name shall be known, and have perpetual succession, with the powers, limitations, and restrictions hereinafter contained, and no other.

SEC. 2. *And be it further enacted*, That so much of the property of the said James Smithson as has been received in money and paid into the Treasury of the United States, being the sum of five hundred and fifteen thousand one hundred and sixty-nine dollars, be lent to the United States Treasury, at six per cent. per annum interest from the first day of September, in the year one thousand eight hundred and thirty-eight, when the same was received into the said treasury; and that so much of the interest as may have accrued on said sum on the first day of July next, which will amount to the sum of two hundred and forty-two thousand one hundred and twenty-nine dollars, or so much thereof as shall, by the Board of Regents of the Institution established by this act, be deemed necessary, be, and the same is hereby, appropriated for the erection of suitable buildings, and for other current incidental expenses of said Institution; and that six per cent. interest on the said trust fund—it being the said amount of five hundred and fifteen thousand one hundred and sixty-nine dollars received into the United States Treasury on the first of September, one thousand eight hundred and thirty-eight, payable in half-yearly payments, on the first of January and July in each year—be, and the same is hereby, appropriated for the perpetual maintenance and support of said Institution; and all expenditures and appropriations to be made, from time to time, to the purposes of the Institution aforesaid, shall be exclusively from the accruing interest, and not from the principal of the said fund. *And be it further enacted*, That all the moneys and stocks which have been, or may hereafter be, received into the Treasury of the United States on account of the fund bequeathed by James Smithson, be, and the same hereby are, pledged to refund to the Treasury of the United States the sums hereby appropriated.

SEC. 3. *And be it further enacted*, That the business of the said Institution shall be conducted at the city of Washington by a Board of Regents, by the name of the Regents of the "Smithsonian Institution," to be composed of the Vice President of the United States, the Chief Justice of the United States, and the Mayor of the city of Washington, during the time for which they shall hold their respective offices; three members of the Senate, and three members of the House of Representatives; together with six other persons, other than members of Congress, two of whom shall be members of the National Institute in the city of Washington, and resident in the said city; and the other four thereof shall be inhabitants of States, and no two of them of the same State. All the Regents, to be selected as aforesaid, shall be appointed immediately after the passage of this act—the members of the Senate by the

President thereof, the members of the House by the Speaker thereof, and the six other persons by joint resolution of the Senate and House of Representatives; and the members of the House so appointed shall serve until the fourth Wednesday in December, the second next after the passage of this act; and then, and biennially thereafter, on every alternate fourth Wednesday of December, a like number shall be appointed in the same manner, to serve until the fourth Wednesday in December, the second succeeding their appointment. And the senators so appointed shall serve during the term for which they shall hold, without re-election, their office as senators. And vacancies occasioned by death, resignation, or otherwise, shall be filled as vacancies in committees are filled. And the other six members aforesaid shall serve, two for two years, two for four years, and two for six years; the terms of service, in the first place, to be determined by lot; but after the first term, then their regular term of service shall be six years; and new elections thereof shall be made by joint resolution of Congress. And vacancies occasioned by death, resignation, or otherwise, may be filled in like manner, by joint resolution of Congress. And the said Regents shall meet in the city of Washington on the first Monday of September next, after the passage of this act, and organize by the election of one of their number as Chancellor, who shall be the presiding officer of said Board of Regents, by the name of the Chancellor of the "Smithsonian Institution," and a suitable person as Secretary of said Institution, who shall also be the Secretary of said Board of Regents; said Board shall also elect three of their own body as an Executive Committee, and said Regents shall then fix on the time for the regular meetings of said Board; and on application of any three of the Regents to the Secretary of the said Institution, it shall be his duty to appoint a special meeting of the Board of Regents, of which he shall give notice by letter to each of the members; and, at any meeting of said Board, five shall constitute a quorum to do business. And each member of said Board shall be paid his necessary travelling and other actual expenses in attending meetings of the Board, which shall be audited by the Executive Committee, and recorded by the Secretary of said Board; but his services as Regent shall be gratuitous. And whenever money is required for the payment of the debts or performance of the contracts of the Institution, incurred or entered into in conformity with the provisions of this act, or for making the purchases and executing the objects authorized by this act, the Board of Regents, or the Executive Committee thereof, may certify to the Chancellor and Secretary of the Board that such sum of money is required; whereupon, they shall examine the same, and, if they shall approve thereof, shall certify the same to the proper officer of the treasury for payment. And the said Board shall submit to Congress, at each session thereof, a report of the operations, expenditures, and condition of the Institution.

SEC. 4. *And be it further enacted*, That after the Board of Regents shall have met, and become organized, it shall be their duty forthwith to proceed to select a suitable site for such building as may be necessary for the Institution; which ground may be taken and appropriated out of that part of the public ground in the city of Washington lying between the Patent Office and Seventh street: *Provided*, The President

of the United States, the Secretary of State, the Secretary of the Treasury, the Secretary of War, the Secretary of the Navy, and the Commissioner of the Patent Office, shall consent to the same; but if the persons last named shall not consent, then such location may be made upon any other of the public grounds within the city of Washington belonging to the United States which said Regents may select, by and with the consent of the persons herein named; and the said ground so selected shall be set out by proper metes and bounds, and a description of the same shall be made and recorded in a book to be provided for that purpose, and signed by the said Regents, or so many of them as may be convened at the time of their said organization; and such record, or a copy thereof, certified by the Chancellor and Secretary of the Board of Regents, shall be received in evidence in all courts of the extent and boundaries of the lands appropriated to the said Institution; and upon the making of such record, such site and lands shall be deemed and taken to be appropriated by force of this act to the said Institution.

SEC. 5. *And be it further enacted*, That, so soon as the Board of Regents shall have selected the said site, they shall cause to be erected a suitable building, of plain and durable materials and structure, without unnecessary ornament, and of sufficient size, and with suitable rooms or halls for the reception and arrangement, upon a liberal scale, of objects of natural history, including a geological and mineralogical cabinet; also, a chemical laboratory, a library, a gallery of art, and the necessary lecture-rooms; and the said Board shall have authority, by themselves, or by a committee of three of their members, to contract for the completion of such building upon such plan as may be directed by the Board of Regents, and shall take sufficient security for the building and finishing the same according to the said plan, and in the time stipulated in such contract; and may so locate said building, if they shall deem it proper, as in appearance to form a wing to the Patent Office building, and may so connect the same with the present hall of said Patent Office building, containing the National Cabinet of Curiosities, as to constitute the said hall, in whole or in part, the deposite for the cabinet of said Institution, if they deem it expedient to do so; provided said building shall be located upon said Patent Office lot in the manner aforesaid: *Provided, however*, That the whole expense of building and enclosures aforesaid shall not exceed the amount of ——; which sum is hereby appropriated, payable out of money in the treasury not otherwise appropriated; together with such sum or sums out of the annual interest accruing to the Institution as may, in any year, remain unexpended after paying the current expenses of the Institution. And duplicates of all such contracts as may be made by the said Board of Regents shall be deposited with the Treasurer of the United States; and all claims on any contract made as aforesaid, shall be allowed and certified by the Board of Regents, or the Executive Committee thereof, as the case may be; and, being signed by the Chancellor and Secretary of the Board, shall be a sufficient voucher for settlement and payment at the treasury of the United States. And the Board of Regents shall be authorized to employ such persons as they may deem necessary to superintend the erection of the building and fitting up the rooms of the Institution. And all laws for the protection of public property in the

city of Washington shall apply to and be in force for the protection of the lands, buildings, and other property of said Institution. And all moneys recovered by or accruing to the Institution shall be paid into the treasury of the United States to the credit of the Smithsonian bequest, and separately accounted for, as provided in the act approved July first, eighteen hundred and thirty-six, accepting said bequest.

SEC. 6. *And be it further enacted*, That, in proportion as suitable arrangements can be made for their reception, all objects of art and of foreign and curious research, and all objects of natural history, plants, and geological and mineralogical specimens belonging, or hereafter to belong, to the United States, which may be in the city of Washington, in whosesoever custody the same may be, shall be delivered to such persons as may be authorized by the Board of Regents to receive them, and shall be arranged in such order, and so classed, as best to facilitate the examination and study of them, in the building so as aforesaid to be erected for the Institution; and the Regents of said Institution shall afterwards, as new specimens in natural history, geology, or mineralogy, may be obtained for the museum of the Institution, by exchanges of duplicate specimens belonging to the Institution, (which they are hereby authorized to make,) or by donation, which they may receive, or otherwise, cause such new specimens to be also appropriately classed and arranged. And the minerals, books, manuscripts, and other property of James Smithson, which have been received by the government of the United States, and are now placed in the Department of State, shall be removed to said Institution, and shall be preserved separate and apart from other property of the Institution.

SEC. 7. *And be it further enacted*, That the Secretary of the Board of Regents shall take charge of the building and property of said Institution, and shall, under their direction, make a fair and accurate record of all their proceedings, to be preserved in said Institution; and the said Secretary shall also discharge the duties of librarian and keeper of the museum, and may, with the consent of the Board of Regents, employ assistants; and the said officers shall receive for their services such sums as may be allowed by the Board of Regents, to be paid semi-annually on the first days of January and July; and the said officers shall be removable by the Board of Regents whenever, in their judgment, the interests of the Institution require any of the said officers to be changed.

SEC. 8. *And be it further enacted*, That the members and honorary members of said Institution may hold such stated and special meetings, for the supervision of the affairs of said Institution and the advice and instruction of said Board of Regents, to be called in the manner provided for in the by-laws of said Institution, at which the President, and, in his absence, the Vice President, of the United States shall preside. And the said Regents shall make, from the interest of said fund, an appropriation, not exceeding an average of twenty-five thousand dollars annually, for the gradual formation of a library composed of valuable works pertaining to all departments of human knowledge.

SEC. 9. *And be it further enacted*, That of any other moneys which have accrued, or shall hereafter accrue, as interest upon the said Smithsonian fund, not herein appropriated, or not required for the pur-

poses herein provided, the said managers are hereby authorized to make such disposal as they shall deem best suited for the promotion of the purpose of the testator, anything herein contained to the contrary notwithstanding.

SEC. 10. *And be it further enacted*, That the author or proprietor of any book, map, chart, musical composition, print, cut, or engraving, for which a copyright shall be secured under the existing acts of Congress, or those which shall hereafter be enacted respecting copyrights, shall, within three months from the publication of said book, map, chart, musical composition, print, cut, or engraving, deliver, or cause to be delivered, one copy of the same to the Librarian of the Smithsonian Institution, and one copy to the Librarian of the Congress Library, for the use of the said libraries.

SEC. 11. *And be it further enacted*, That there is reserved to Congress the right of altering, amending, adding to, or repealing any of the provisions of this act: *Provided*, That no contract, or individual right, made or acquired under such provisions, shall be thereby divested or impaired.

Approved August 10, 1846.

Construction of the "act establishing the Smithsonian Institution," by Hon. J. MacPherson Berrien, one of the Regents.

It will be argued at the outset that the fund ought to be so administered as to give the fullest effect to the purposes of the donor; that the government of the United States, as the depositary of his confidence, has power to determine the mode of administration, and that its determination, so far as it extends, must guide and control the action of the Board of Regents. Beyond that limit I suppose it will also be conceded that the Board has discretionary powers, acting as it does, under the constant supervision of Congress, which body has reserved to itself the right of modifying its grant of power, *ad libitum*, with the ordinary saving of individual rights.

We are, then, to look to the act of Congress to ascertain what Congress has directed, and what it has left at large. The act of 1846 creates what it denominates "an establishment," with a corporate name, invested with the powers, and subjected to the limitations and restrictions, specified in the act. It directs the selection of a lot, and the erection of a building, with suitable arrangements for the classification and arrangement of the several objects specified in the 6th section. It places that building and those objects under the control of the Board of Regents. It requires them to make, from the interest of the fund, an appropriation *not exceeding* $25,000 annually, for the gradual formation of a library. Out of any other interest moneys accrued or accruing not therein appropriated, or not required for the purposes therein provided, the Board is authorized "to make such disposal as they shall deem best suited for the *promotion of the purpose of the testator*, anything therein contained to the contrary notwithstanding."

In my opinion, this places the whole income of the fund under the

control of the Board of Regents. They must erect a building, suitably arranged to fulfil the purposes of Congress, but its cost is not limited. They must appoint a Secretary, but his salary is not specified. They must make an appropriation for the gradual formation of a library, of which the *maximum* only is provided, and then of all other moneys, accruing as interest, they may make such disposal as *they* shall *deem* best suited to promote the purposes of the donor, any former provision to the contrary notwithstanding.

Whether, in the exercise of this discretionary power, the Board ought to look mainly to the gradual formation of a *library*, to the exclusion of other objects which they may deem better calculated to promote the purpose of Mr. Smithson, is a question which may be considered in a twofold view.

We may inquire—1. Whether there is anything in the act of Congress which requires this preference? I confine the inquiry to the *act itself*, and exclude the *expressed opinions of individuals* who participated in its enactment, as well as the *votes* of the two Houses *upon particular propositions* submitted while it was under discussion; the *first*, because it is *the act*, which *alone* expresses the *will* of the legislature, in the enactment of which different individuals may have concurred for very different reasons; the *second*, because a rejected proposition may have been voted down, not because it was deemed unwise or improper, but because it was considered unnecessary and superfluous; at all events, of those who reject it, some may have been influenced by the former, and others by the latter consideration. The proceedings on this bill will help to illustrate this. The bill reported by the committee contained various specific provisions—as for a library, scientific collections, publications, &c., &c., &c. These were stricken out. Why? Because they were deemed inexpedient or improper? No; but because, since the act specified no amount which the Board was required to expend for a library, and left all the other accruing income, besides that which they determined to apply to this object, subject to their entire control, it would have been simply superfluous, as they were provided for by this general grant of power. I see nothing, therefore, in *the act of Congress* which requires the Board to give this preference to a library, to the exclusion of any other objects which they may deem more consonant to the purposes of the donor.

The remaining question is—2. Have they erred in the exercise of the discretion confided to them? I think not. The purpose of the testator was twofold:

The *increase* of knowledge *among men.*

Its *diffusion among men.*

It was not to enable the few persons who could have access to a library at Washington to master the knowledge *already existing* among men, but to *increase* the *sum* of that knowledge, and to give it a *world-wide diffusion.* The first object might be attained by a library at Washington sufficiently comprehensive to embrace what is *now known* among men. The last can only be accomplished by the *labors of scientific men*, and their *diffusion* by the Board *throughout the civilized world.* But this subject is so well and thoroughly discussed by the committee, that I leave it with the simple expression of my entire

concurrence in the reasoning and conclusion of their report. One other remark: Looking to the limited amount of the income, and to the expenditures, which Congress must have foreseen, I find it impossible to suppose that they could have contemplated any considerable expenditure for the library; since in thus providing for the acquirement, by a *limited* portion of *our own people*, of such knowledge as men *have hitherto attained*, they would have precluded all efforts for *its increase* and *diffusion throughout the world*, and have thus defeated what seems to me to have been the most cherished wish of Mr. Smithson.

The only *official agents* provided by the acts of Congress are those specified in the third section, namely—the Board of Regents, the Chancellor, and the Executive Committee. By these it requires "the business of the said Institution to be conducted." Proceeding to define the duties of the *Secretary*, it constitutes him "librarian and keeper of the museum," charges him with the care of "the building and property of the Institution," and requires him, under the direction of the Board of Regents, "to make a fair and accurate statement of all their proceedings." Having thus traversed the whole circle of official duties, and aware that those assigned to the Secretary might become too onerous for a single individual, it authorized *him*, with the assent of the Board of Regents, to "employ assistants;" but such persons were, strictly speaking, not officers of *the Institution*, but, in the language of the act, *employés of the Secretary*, or, as the act expresses it, his "*assistants;*" and in this sense only can the term "officers," used in the 7th section, when speaking of their liability to removal by the Board of Regents, be understood. The subordinate officers of the customs furnish a somewhat analogous case. They are appointed by the collector with the approbation of the Secretary of the Treasury. Now, the Secretary, as the official organ of the President, can remove both the collector and his subordinates, but this does not prevent the collector from removing them.

From what I have written, my opinion will be understood to be, that the "assistants" *of the Secretary* are liable to removal by that officer, and that such removal would be effective, unless the Board, in the exercise of its controlling power over the Secretary, should think proper to interfere.

JOHN MACPHERSON BERRIEN.

SAVANNAH, *July*, 1854.

Extract from an Address by the Secretary on the Smithsonian Institution.

I propose answering in this lecture the following questions:

1. Who was James Smithson; and what was his character and pursuits?

2. What was his bequest; and what were its objects?

3. What plan has been adopted for carrying out the intention of the testator; and what fruit has this plan produced?

(1.) Smithson claimed to be of noble descent; and in his will declares himself the son of Hugh, first Duke of Northumberland, and of Elizabeth, niece of Charles the Proud, Duke of Somerset. He was educated at Oxford, and paid particular attention to the study of the physical sciences; was reputed to be the best chemist in the university, and was one of the first to adopt the method of minute analysis. As an example of his expertness in this line, it is mentioned that on one occasion he caught a tear as it was trickling down the face of a lady, lost half, examined the remainder, and discovered in it several salts. He made about thirty scientific communications to different societies, principally on chemistry, mineralogy, and geology. His scientific reputation was founded on these branches, though, from his writings, he appears to have studied and reflected upon almost every department of knowledge. He was of a sensitive, retiring disposition—passed most of his life on the Continent—was never married—appeared ambitious of making a name for himself, either by his own researches or by founding an institution for the promotion of science. He declares, in writing, that though the best blood of England flows in his veins, this avails him not, for his name would live in the memory of men when the titles of the Northumberlands and the Percies are extinct or forgotten. He was cosmopolitan in his views, and declares that the man of science is of no country—the world is his country, and all men his countrymen. He purposed at one time to leave his money to the Royal Society of London for the promotion of science, but on account of a misunderstanding with the council of the society, he changed his mind and left it to his nephew; and, in case of the death of this relative, to the United States of America, to found the Institution which now bears his name.

(2.) In answer to the second question, I would state that the whole amount of money received from the bequest was $515,169; and besides this, $25,000 was left in England, as the principal of an annuity given to the mother of the nephew of Smithson. This sum will also come to the Institution at the death of this person.

The government of the United States accepted the bequest, or, in other words, accepted the office of trustee, and Mr. Rush, of Pennsylvania, a gentleman who is still an active and efficient member of the Board of Regents, and one of the most ardent supporters of the Institution, was charged with the duty of prosecuting the claim. He remained in attendance on the English courts until the money was awarded to him. He brought it over in sovereigns—deposited it in the mint of the United States, where it was recoined into American eagles—thus becoming a part of the currency of the country. This money was afterwards lent to some of the new States, and a portion of it was lost; but it did not

belong to the United States—it was the property of the Smithsonian Institution—and the government was bound in honor to restore it. Congress has acknowledged this by declaring that the money is still in the treasury of the nation, bearing interest at the rate of six per cent., annually producing a revenue of about thirty thousand dollars.

It may be stated, in this place, that the principal remains perpetually in the treasury of the United States, and that nothing but the interest can be expended; not only has the original bequest been preserved, but a considerable addition has been made to the principal. At the time of the passing of the act establishing the Institution in 1846, the sum of $242,000 had accrued in interest, and this the Regents were authorized to expend on a building; but instead of appropriating this sum immediately to this purpose, they put it at interest, and deferred the completion of the building for several years, until $150,000 should be accumulated, the income of which might defray the expense of keeping the building, and the greater portion of the income of the original bequest be devoted to the objects for which it was designed. This policy has been rigidly adhered to, and the result is, that besides the original sum, and after all that has been devoted to the building, the grounds, and all other operations, there is now on hand $200,000 of accumulated interest. Of this sum, $50,000 are to be appropriated to finishing the building, and the remainder is to be added to the principal. The funds have therefore been carefully husbanded.

The bequest, in the language of the testator, was, "*to found at Washington an establishment, under the name of the Smithsonian Institution, for the increase and diffusion of knowledge among men.*"

According to this, the government of the United States is merely a trustee. The bequest is for the benefit of mankind, and any plan which does not recognise this provision of the will would be illiberal and unjust.

The Institution must bear and perpetuate the name of its founder; and hence its operations ought to be kept distinct from those of the government, and all the good which results from the expenditure of the fund should be accredited to the name of Smithson.

The object of the bequest is twofold: first, to *increase;* and second, to *diffuse* knowledge among men. These two objects are entirely distinct, and ought not to be confounded with one another. The first is to enlarge the existing stock of knowledge by the addition of new truths; and the second, to disseminate knowledge, thus enlarged, among men. The distinction is generally recognised by men of science, and in Europe different classes of scientific and other societies are founded upon it.

Again: the will makes no restriction in favor of any particular kind of knowledge, and hence all branches are entitled to a share of attention. Smithson was well aware that knowledge should not be viewed as existing in isolated parts, but as a whole, each portion of which throws light on all the other, and that the tendency of all is to improve the human mind, and to give it new sources of power and enjoyment. The most prevalent idea, however, in relation to the will, is that the money was intended exclusively for the diffusion of useful or immediately practical knowledge among the inhabitants of this country, but

it contains nothing from which such an inference can be drawn. All knowledge is useful, and the higher the more important. From the enunciation of a single scientific truth may flow a hundred inventions, and the higher the truth the more important the deductions.

To effect the greatest good, the organization of the Institution should be such as to produce results which could not be attained by other means, and inasmuch as the bequest is for men in general, all merely local expenditures are violations of the will.

These views were not entertained at first, and great difficulties have been encountered in carrying them out. A number of literary men thought that a great library should be founded at Washington, and all the money expended on it. Others considered a museum the proper object; and another class thought the income should be devoted to the delivery of lectures throughout the country; while still another was of opinion that popular tracts should be published and distributed among the million. But all these were advanced without a proper examination of the will, or a due consideration of the smallness of the income. The diffusion of tracts has been a favorite idea; but it must be recollected that a single report of the Patent Office costs the government three times as much as the whole income of the Smithsonian fund. A single pamphlet of ten pages could not annually be printed by the Institution, and distributed to all who would have a claim to it.

(3.) The next question is, by what plan can the several requisitions of the will be fulfilled?

This question was not fully settled by the act of Congress. It directed the formation of a library, a museum, a gallery of arts, lectures, and a building on a liberal scale to accommodate these objects. One clause, however, gave the Regents the power, after the foregoing objects are provided for, to expend the remainder of the income in any way they may think fit for carrying out the design of the testator.

The objects specified in the act of Congress evidently do not come up to the idea of the testator, as deduced from a critical examination of his will. A library, a museum, a gallery of arts, though important in themselves, are local in their influence. I have from the beginning advocated this opinion on all occasions, and shall continue to advocate it whenever a suitable opportunity occurs.

The question, therefore, again recurs: what plan can be adopted in conformity with the terms of the bequest?

There are two: First, a number of men may be appointed by the Institution to make researches in the different branches of science, and to send accounts of their discoveries to all parts of the world. In this way, in the strictest sense of the terms, knowledge would be increased and diffused. But this plan is not compatible with the limited income of the Institution, and would offer many practical difficulties.

The other plan, and the one adopted, is to stimulate all persons in this country capable of advancing knowledge by original research, to labor in this line—to induce them to send the results to the Institution for examination and publication, and to assist all persons engaged in original investigations as far as the means of the Institution will allow; also to institute, at the expense and under the direction of the Institu-

tion, particular researches. This plan has been found eminently practicable, and by means of it the Institution has been enabled to produce results which have made it favorably known in every part of the civilized world. The communications are submitted to competent judges, who vouch for the value and truth of the discoveries. The publications which result from this plan are presented to all the first-class libraries in the world, as well as to all colleges and well-established public institutions in this country. The intention is to place the publications in such positions as will enable them to be seen by the greatest number of persons. In this way a knowledge of the discoveries are diffused among men as widely as the income will allow.

No copyright is taken for the memoirs, and the writers of popular books are at liberty to use them in the compilation of their works. The knowledge which they contain is thus, in time, still more generally diffused. In other countries, institutions for the promotion of the discovery of new truths, and the publication of the results, are endowed by the government; but there are no institutions for this purpose here, and hence men of science labor under great disadvantages. The higher the value of a work of science, the fewer do its readers become. If writers wish to make money by their labors, they must publish novels.

The Principia of Newton did not pay for itself, and yet in the present day every one shares in the benefits accruing from it.

Another part of the plan is to publish reports on scientific subjects, and to spread them as widely as the state of the funds will allow.

NOTE.—For an account of what has actually been accomplished, see the several reports of the Secretary.

REPORTS OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION,

FROM 1847 TO 1853.

To make the operations of the Institution more generally known, it has been thought advisable to append to this Report, for reprinting, the several Annual Reports of the Secretary. They give a connected history of all the operations of the Institution, from its organization to the end of the year 1852. These Reports exhibit the fact that very little change has been made in the plan of active operations originally adopted, and that all the anticipations which were entertained in regard to it have been fully realized.

FIRST REPORT.*

Report of the Secretary of the Smithsonian Institution to the Board of Regents, December 8, 1847.

GENTLEMEN: A statement of the financial condition of the Smithsonian Institution, and of the progress made in the erection of the building, having been presented to your Board by the committees charged with the care of these objects, it becomes my duty, as Secretary of the Institution, to give an account of what has been done relative to the development of the plan of organization, and of the steps which have been taken in the way of carrying it into operation.

In accordance with my instructions, I consulted with men of eminence, in the different branches of literature and science, relative to the details of the plan of organization, and arranged the various suggestions offered in the form of the accompanying programme. This, after having been submitted to a number of persons in whose knowledge and judgment I have confidence, is now presented to the Board, with the concurrence of the Committee on Organization, for consideration and provisional adoption. I regret that my engagements have been such as to render it impossible for me to call upon many persons whose counsel would have been valuable, but I hope hereafter to avail myself of their advice in behalf of the Institution. I also regret that I could not give the names of those whose suggestions have been adopted in the programme; the impossibility of rendering justice to all has prevented

* The first Report of the Secretary was given in the second Report of the Regents to Congress, hence the number of the former is one less than that of the latter.

my attempting this. Many of the suggestions have been offered by different persons, independently of each other; and, indeed, the general plan of the increase and diffusion of knowledge, as adopted by the Board, is such as would naturally arise in the mind of any person conversant with the history of physical science, and with the means usually employed for its extension and diffusion.

The introduction to the programme contains a series of propositions, suggested by a critical examination of the will of Smithson, to serve as a guide in judging of the fitness of any proposed plan for carrying out the design of the testator. The first section of the programme gives the details of the plan proposed for the increase and diffusion of knowledge by means of publication and original researches. The second section furnishes the details, so far as they can be made out at the present time, of the formation of a library, and a collection of objects of nature and art. These two plans combined, embrace the general propositions adopted by the Board of Regents at their last meeting as the basis of future operations. It is intended in the proposed plan to harmonize the two modes of increasing and diffusing knowledge, and to give to the Institution the widest influence compatible with its limited income. That all the propositions will meet with general approval cannot be expected; and that this organization is the best that could be devised is neither asserted nor believed. To produce *a priori* a plan of organization which shall be found to succeed perfectly in practice, and require no amendment, would be difficult under the most favorable circumstances, and becomes almost impossible where conflicting opinions are to be harmonized, and the definite requirements of the act establishing the Institution are to be observed. It is not intended that the details of the organization, as given in the programme, should be permanently adopted without careful trial; they are rather presented as suggestions to be adopted provisionally, and to be carried into operation gradually and cautiously, with such changes, from time to time, as experience may dictate.

PROGRAMME OF ORGANIZATION OF THE SMITHSONIAN INSTITUTION.

[Presented to the Board of Regents, December 8, 1847.]

INTRODUCTION.

General considerations which should serve as a guide in adopting a plan of organization.

1. Will of Smithson. The property is bequeathed to the United States of America, "to found at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men."

2. The bequest is for the benefit of mankind. The government of the United States is merely a trustee to carry out the design of the testator.

3. The Institution is not a national establishment, as is frequently

supposed, but the establishment of an individual, and is to bear and perpetuate his name.

4. The objects of the Institution are—1st, to increase, and 2d, to diffuse, knowledge among men.

5. These two objects should not be confounded with one another. The first is to increase the existing stock of knowledge by the addition of new truths; and the second to disseminate knowledge, thus increased, among men.

6. The will makes no restriction in favor of any particular kind of knowledge; hence all branches are entitled to a share of attention.

7. Knowledge can be increased by different methods of facilitating and promoting the discovery of new truths, and can be most efficiently diffused among men by means of the press.

8. To effect the greatest amount of good, the organization should be such as to enable the Institution to produce results in the way of increasing and diffusing knowledge, which cannot be produced by the existing institutions in our country.

9. The organization should also be such as can be adopted provisionally, can be easily reduced to practice, receive modifications, or be abandoned, in whole or in part, without a sacrifice of the funds.

10. In order to make up for the loss of time occasioned by the delay of eight years in establishing the Institution, a considerable portion of the interest which has accrued should be added to the principal.

11. In proportion to the wide field of knowledge to be cultivated, the funds are small. Economy should therefore be consulted in the construction of the building; and not only should the first cost of the edifice be considered, but also the continual expense of keeping it in repair, and of the support of the establishment necessarily connected with it. There should also be but few individuals permanently supported by the Institution.

12. The plan and dimensions of the building should be determined by the plan of the organization, and not the converse.

13. It should be recollected that mankind in general are to be benefitted by the bequest; and that, therefore, all unnecessary expenditure on local objects would be a perversion of the trust.

14. Besides the foregoing considerations, deduced immediately from the will of Smithson, regard must be had to certain requirements of the act of Congress establishing the Institution. These are a library, a museum, and a gallery of art, with a building on a liberal scale to contain them.

SECTION I.

Plan of organization of the Institution, in accordance with the foregoing deductions from the will of Smithson.

To Increase Knowledge. It is proposed—

1. To stimulate men of talent to make original researches, by offering suitable rewards for memoirs containing new truths; and,

2. To appropriate annually a portion of the income for particular researches, under the direction of suitable persons.

To Diffuse Knowledge. It is proposed—

1. To publish a series of periodical reports on the progress of the different branches of knowledge; and,

2. To publish occasionally separate treatises on the subjects of general interest.

DETAILS OF THE PLAN TO INCREASE KNOWLEDGE.

I. *By stimulating researches.*

1. Rewards, consisting of money, medals, &c., offered for original memoirs on all branches of knowledge.

2. The memoirs thus obtained to be published in a series of volumes in a quarto form, and entitled "Smithsonian Contributions to Knowledge."

3. No memoir on subjects of physical science to be accepted for publication which does not furnish a positive addition to human knowledge resting on original research; and all unverified speculations to be rejected.

4. Each memoir presented to the Institution to be submitted for examination to a commission of persons of reputation for learning in the branch to which the memoir pertains, and to be accepted for publication only in case the report of this commission is favorable.

5. The commission to be chosen by the officers of the Institution, and the name of the author, as far as practicable, concealed, unless a favorable decision be made.

6. The volumes of the memoirs to be exchanged for the transactions of literary and scientific societies, and copies to be given to all the colleges and principal libraries in this country. One part of the remaining copies may be offered for sale; and the other carefully preserved, to form complete sets of the volumes, to supply the demand from new institutions.

7. An abstract, or popular account, of the contents of these memoirs to be given to the public, through the annual report of the Regents to Congress.

II. *By appropriating a portion of the income, annually, to special objects of research, under the direction of suitable persons.*

1. The objects, and the amount appropriated, to be recommended by counsellors of the Institution.

2. Appropriations in different years to different objects; so that, in course of time, each branch of knowledge may receive a share.

3. The results obtained from these appropriations to be published, with the memoirs before mentioned, in the volumes of the Smithsonian Contributions to Knowledge.

4. Examples of objects for which appropriations may be made:

(1.) System of extended meteorological observations, for solving the problem for American storms.

(2.) Explorations in descriptive natural history, and geological, magnetical, and topographical surveys, to collect materials for the formation of a Physical Atlas of the United States.

(3.) Solution of experimental problems, such as a new determination of the weight of the earth, of the velocity of electricity and of light; chemical analyses of soils and plants; collection and publication of articles of science, accumulated in the offices of government.

(4.) Institution of statistical inquiries with reference to physical, moral, and political subjects.

(5.) Historical researches, and accurate surveys of places celebrated in American history.

(6.) Ethnological researches, particularly with reference to the different races of men in North America; also, explorations and accurate surveys of the mounds and other remains of the ancient people of our country.

DETAILS OF THE PLAN FOR DIFFUSING KNOWLEDGE.

I. *By the publication of a series of reports, giving an account of the new discoveries in science, and of the changes made from year to year in all branches of knowledge not strictly professional.*

1. These reports will diffuse a kind of knowledge generally interesting, but which, at present, is inaccessible to the public. Some of the reports may be published annually, others at longer intervals, as the income of the Institution, or the changes in the branches of knowledge, may indicate.

2. The reports are to be prepared by collaborators eminent in the different branches of knowledge.

3. Each collaborator to be furnished with the journals and publications, domestic and foreign, necessary to the compilation of his report; to be paid a certain sum for his labors, and to be named on the title-page of the report.

4. The reports to be published in separate parts, so that persons interested in a particular branch can procure the parts relating to it without purchasing the whole.

5. These reports may be presented to Congress for partial distribution; the remaining copies to be given to literary and scientific institutions, and sold to individuals for a moderate price.

The following are some of the subjects which may be embraced in the reports:

I. PHYSICAL CLASS.

1. Physics, including astronomy, natural philosophy, chemistry, and meteorology.
2. Natural history, including botany, zoology, geology, &c.
3. Agriculture.
4. Application of science to arts.

II. MORAL AND POLITICAL CLASS.

5. Ethnology, including particular history, comparative philology, antiquities, &c.

6. Statistics and political economy.
7. Mental and moral philosophy.
8. A survey of the political events of the world, penal reform, &c.

III. LITERATURE AND THE FINE ARTS.

9. Modern literature.
10. The fine arts, and their application to the useful arts.
11. Bibliography.
12. Obituary notices of distinguished individuals.

II. *By the publication of separate treatises on subjects of general interest.*

1. These treatises may occasionally consist of valuable memoirs translated from foreign languages, or of articles prepared under the direction of the Institution, or procured by offering premiums for the best exposition of a given subject.
2. The treatises should in all cases be submitted to a commission of competent judges previous to their publication.
3. As examples of these treatises, expositions may be obtained of the present state of the several branches of knowledge mentioned in the table of reports. Also of the following subjects, suggested by the Committee on Organization, viz: the statistics of labor, the productive arts of life, public instruction, &c.

SECTION II.

Plan of organization, in accordance with the terms of the resolutions of the Board of Regents, providing for the two modes of increasing and diffusing knowledge.

1. The act of Congress establishing the Institution contemplated the formation of a library and a museum; and the Board of Regents, including these objects in the plan of organization, resolved to divide the income into two equal parts.
2. One part to be appropriated to increase and diffuse knowledge by means of publications and researches, agreeably to the scheme before given. The other part to be appropriated to the formation of a library and a collection of objects of nature and of art.
3. These two plans are not incompatible with one another.
4. To carry out the plan before described, a library will be required, consisting—1st, of a complete collection of the transactions and proceedings of all the learned societies in the world; 2d, of the more important current periodical publications, and other works necessary in preparing the periodical reports.
5. The Institution should make special collections, particularly of objects to verify its own publications.
6. Also, a collection of instruments of research in all branches of experimental science.
7. With reference to the collection of books other than those mentioned above, catalogues of all the different libraries in the United States

should be procured, in order that the valuable books first purchased may be such as are not to be found in the United States.

8. Also, catalogues of memoirs, and of books in foreign libraries, and other materials, should be collected, for rendering the Institution a centre of bibliographical knowledge, whence the student may be directed to any work which he may require.

9. It is believed that the collections in Natural History will increase by donation as rapidly as the income of the Institution can make provision for their reception; and, therefore, it will seldom be necessary to purchase any articles of this kind.

10. Attempts should be made to procure for the Gallery of Arts casts of the most celebrated articles of ancient and modern sculpture.

11. The arts may be encouraged by providing a room, free of expense, for the exhibition of the objects of the Art Union, and other similar societies.

12. A small appropriation should annually be made for models of antiquities, such as those of the remains of ancient temples, &c.

13. For the present, or until the building is fully completed, besides the Secretary, no permanent assistant will be required, except one, to act as librarian.

14. The duty of the Secretary will be the general superintendence, with the advice of the Chancellor and other members of the establishment, of the literary and scientific operations of the Institution; to give to the Regents annually an account of all the transactions, of the memoirs which have been received for publication, and of the researches which have been made; and to edit, with the assistance of the Librarian, the publications of the Institution.

15. The duty of the Assistant Secretary, acting as Librarian, will be, for the present, to assist in taking charge of the collections; to select and purchase, under the direction of the Secretary and a committee of the Board, books and catalogues, and to procure the information before mentioned; to give information on plans of libraries, and to assist the Secretary in editing the publications of the Institution, and in the other duties of his office.

16. The Secretary and his assistants, during the session of Congress, will be required to illustrate new discoveries in sciences, and to exhibit new objects of art; also, distinguished individuals should be invited to give lectures on subjects of general interest.

17. When the building is completed, and when, in accordance with the act of Congress, the charge of the National Museum is given to the Smithsonian Institution, other assistants will be required.

Explanations and illustrations of the programme.

Though the leading propositions of the programme have been fully discussed by the Board, yet it will be important to offer some remarks in explanation and illustration of them in their present connexion.

That the Institution is not a national establishment, in the sense in which institutions dependent on the government for support are so, must

be evident, when it is recollected that the money was not absolutely given to the United States, but intrusted to it for a special object, namely—the establishment of an institution for the benefit of men, to bear the name of the donor, and consequently to reflect upon his memory the honor of all the good which may be accomplished by means of the bequest. The operations of the Smithsonian Institution ought, therefore, to be mingled as little as possible with those of the government, and its funds should be applied exclusively and faithfully to the increase and diffusion of knowledge among men.

That the bequest is intended for the benefit of men in general, and that its influence ought not to be restricted to a single district, or even nation, may be inferred not only from the words of the will, but also from the character of Smithson himself; and I beg leave to quote, from a scrap of paper in his own hand, the following sentiment bearing on this point: "The man of science has no country; the world is his country—all men his countrymen." The origin of the funds, the bequest of a foreigner, should also preclude the adoption of a plan which does not, in the words of Mr. Adams, "spread the benefits to be derived from the Institution not only over the whole surface of this Union, but throughout the civilized world." "Mr. Smithson's reason for fixing the seat of his Institution at Washington obviously was, that *there* is the seat of government of the United States, and *there* the Congress by whose legislation, and the Executive through whose agency, the trust committed to the honor, intelligence, and good faith of the nation, is to be fulfilled." The centre of operations being permanently fixed at Washington, the character of this city for literature and science will be the more highly exalted in proportion as the influence of the Institution is more widely diffused.

That the terms *increase* and *diffusion* of knowledge are logically distinct, and should be literally interpreted with reference to the will, must be evident when we reflect that they are used in a definite sense, and not as mere synonymes, by all who are engaged in the pursuits to which Smithson devoted his life. In England there are two classes of institutions founded on the two ideas conveyed by these terms. The Royal Society, the Astronomical, the Geological, the Statistical, the Antiquarian Societies, all have for their object the increase of knowledge; while the London Institution, the Mechanics' Institution, the Surry Institution, the Society for the Diffusion of Religious Knowledge, the Society for the Diffusion of Useful Knowledge, are all intended to diffuse or disseminate knowledge among men. In our own country, also, the same distinction is observed in the use of the terms by men of science. Our colleges, academies, and common schools, are recognised as institutions partially intended for the diffusion of knowledge; while the express object of some of our scientific societies is the promotion of the discovery of new truths.

The will makes no restriction in favor of any particular kind of knowledge; though propositions have been frequently made for devoting the funds exclusively to the promotion of certain branches of science having more immediate application to the practical arts of life, and the adoption of these propositions has been urged on the ground of the conformity of such objects to the pursuits of Smithson; but an examination

of his writings will show that he excluded from his own studies no branch of general knowledge, and that he was fully impressed with the important philosophical fact, that all subjects of human thought relate to one great system of truth. To restrict, therefore, the operations of the Institution to a single science or art, would do injustice to the character of the donor, as well as to the cause of general knowledge. If preference is to be given to any branches of research, it should be to the higher, and apparently more abstract; to the discovery of new principles, rather than of isolated facts. And this is true even in a practical point of view. Agriculture would have forever remained an empirical art, had it not been for the light shed upon it by the atomic theory of chemistry; and incomparably more is to be expected as to its future advancement from the perfection of the microscope, than from improvements in the ordinary instruments of husbandry.

The plan of increasing and diffusing knowledge, presented in the first section of the programme, will be found in strict accordance with the several propositions deduced from the will of Smithson, and given in the introduction. It embraces, as a leading feature, the design of interesting the greatest number of individuals in the operations of the Institution, and of spreading its influence as widely as possible. It forms an active organization, exciting all to make original researches who are gifted with the necessary power, and diffusing a kind of knowledge, now only accessible to the few, among all those who are willing to receive it. In this country, though many excel in the application of science to the practical arts of life, few devote themselves to the continued labor and patient thought necessary to the discovery and development of new truths. The principal cause of this want of attention to original research is the want, not of proper means, but of proper encouragement. The publication of original memoirs and periodical reports, as contemplated by the programme, will act as a powerful stimulus on the latent talent of our country, by placing in bold relief the real laborers in the field of original research, while it will afford the best materials for the use of those engaged in the diffusion of knowledge.

The advantages which will accrue from the plan of publishing the volumes of the Smithsonian Contributions to Knowledge are various. In the first place, it will serve to render the name of the founder favorably known wherever literature and science are cultivated, and to keep it in continual remembrance with each succeeding volume, as long as knowledge is valued. A single new truth, first given to the world through these volumes, will forever stamp their character as a work of reference. The Contributions will thus form the most befitting monument to perpetuate the name of one whose life was devoted to the increase of knowledge, and whose ruling passion, strong in death, prompted the noble bequest intended to facilitate the labors of others in the same pursuit.

Again: the publication of a series of volumes of original memoirs will afford to the Institution the most ready means of entering into friendly relations and correspondence with all the learned societies in the world, and of enriching its library with their current transactions and proceedings. But perhaps the most important effect of the plan will be that of giving to the world many valuable memoirs, which, on

account of the expense of the illustrations, could not be otherwise published. Every one who adds new and important truths to the existing stock of knowledge must be, of necessity, to a certain degree, in advance of his age. Hence the number of readers and purchasers of a work is often in the inverse ratio of its intrinsic value; and consequently authors of the highest rank of merit are frequently deterred from giving their productions to the world on account of the pecuniary loss to which the publication would subject them. When our lamented countryman, Bowditch, contemplated publishing his commentary on La Place, he assembled his family and informed them that the execution of this design would sacrifice one-third of his fortune, and that it was proper his heirs should be consulted on a subject which so nearly concerned them. The answer was worthy of the children of such a father: "We value," said they, "your reputation more than your money." Fortunately, in this instance, the means of making such a sacrifice existed; otherwise, one of the proudest monuments of American science could not have been given to the world. In the majority of cases, however, those who are most capable of extending human knowledge are least able to incur the expense of the publication. Wilson, the American ornithologist, states, in a letter to Michaux, that he has sacrificed everything to publish his work. "I have issued," he says, "six volumes, and am engaged on the seventh; but as yet I have not received a single cent of the proceeds." In an address on the subject of natural history, by one of our most active cultivators of this branch of knowledge, we find the following remarks, which are directly in point: "Few are acquainted with the fact that from the small number of scientific works sold, and the great expense of plates, our naturalists not only are not paid for their labors, but suffer pecuniary loss from their publications. Several works on different branches of zoology, now in the course of publication, will leave their authors losers by an aggregate of $15,000. I do not include in this estimate works already finished—one, for instance, the best contribution to the natural history of man extant, the publication of which will occasion its accomplished author a loss of several thousand dollars. A naturalist is extremely fortunate if he can dispose of 200 copies of an illustrated work, and the number of copies printed rarely exceeds 250." It may be said that these authors have their reward in the reputation which they thus purchase; but reputation should be the result of the talents and labor expended in the production of a work, and should not in the least depend upon the fact that the author is able to make a pecuniary sacrifice in giving the account of his discoveries to the public.

Besides the advantage to the author of having his memoir published in the Smithsonian Contributions free of expense, his labors will be given to the world with the stamp of approval of a commission of learned men; and his merits will be generally made known through the reports of the Institution. Though the premiums offered may be small, yet they will have considerable effect in producing original articles. Fifty or a hundred dollars awarded the author of an original paper will, in many instances, suffice to supply the books, or to pay for the materials, or the manual labor required, in prosecuting the research.

There is one proposition of the programme which has given rise to

much discussion, and which, therefore, requires particular explanation: I allude to that which excludes from the contributions all papers consisting merely of unverified speculations on subjects of physical science. The object of this proposition is to obviate the endless difficulties which would occur in rejecting papers of an unphilosophical character; and though it may in some cases exclude an interesting communication, yet the strict observance of it will be found of so much practical importance that it cannot be dispensed with. It has been supposed, from the adoption of this proposition, that we are disposed to undervalue abstract speculations: on the contrary, we know that all the advances in true science—namely, a knowledge of the laws of phenomena—are made by provisionally adopting well conditioned hypotheses, the product of the imagination, and subsequently verifying them by an appeal to experiment and observation. Every new hypothesis of scientific value must not only furnish an exact explanation of known facts, but must also enable us to predict, in kind and quantity, the phenomena which will be exhibited under any given combination of circumstances. Thus, in the case of the undulatory hypothesis of light, it was inferred, as a logical consequence, that if the supposition were true that light consisted of waves of an ethereal medium, then two rays of light, like two waves of water under certain conditions, should annihilate each other, and darkness be produced. The experiment was tried, and the anticipated result was obtained. It is this exact agreement of the deduction with the actual result of experience that constitutes the verification of an hypothesis, and which alone entitles it to the name of a theory, and to a place in the transactions of a scientific institution. It must be recollected that it is much easier to speculate than to investigate, and that very few of all the hypotheses imagined are capable of standing the test of scientific verification.

For the practical working of the plan for obtaining the character of a memoir, and the precaution taken before it is accepted for publication, I would refer to the correspondence, given in a subsequent part of this report, relative to the memoir now in process of publication by the Institution. As it is not our intention to interfere with the proceedings of other institutions, but to co-operate with them, so far as our respective operations are compatible, communications may be referred to learned societies for inspection, as in the case of the above mentioned memoir, and abstracts of them given to the world through the bulletins of these societies, while the details of the memoirs and their expensive illustrations are published in the volumes of the Smithsonian Contributions. The officers of several learned societies in this country have expressed a willingness to co-operate in this way.

Since original research is the most direct way of increasing knowledge, it can scarcely be doubted that a part of the income of the bequest should be appropriated to this purpose, provided suitable persons can be found, and their labors be directed to proper objects. The number, however, of those who are capable of discovering scientific principles, is comparatively small; like the poet, they are "born, not made;" and, like him, must be left to choose their own subject, and wait the fitting time of inspiration. In case a person of this class has fallen on a vein of discovery, and is pursuing it with success, the better

plan will be to grant him a small sum of money to carry on his investigations, provided they are considered worthy of assistance by competent judges. This will have the double effect of encouraging him in the pursuit, and of facilitating his progress. The Institution, however, need not depend upon cases of this kind, even if they were more numerous than they are, for the application of its funds in the line of original research. There are large fields of observation and experiment, the cultivation of which, though it may afford no prospect of the discovery of a principle, can hardly fail to produce results of importance both in a practical and theoretic point of view. As an illustration of this remark, I may mention the case of the investigations made a few years ago by a committee of the Franklin Institute, of Philadelphia. The Secretary of the Treasury of the United States placed at the disposal of this society a sum of money, for the purpose of making experiments with reference to the cause of the explosion of steam-boilers. A committee of the society was chosen for this purpose, which adopted the ingenious plan of writing to all persons in the United States engaged in the application of steam, and particularly to those who had observed the explosion of a steam-boiler. In this way opinions and suggestions in great variety, as to the cause of explosions, were obtained. The most plausible of these were submitted to the test of experiment; the results obtained were highly important, and are to be found favorably mentioned in every systematic work on the subject of steam which has appeared in any language, within the last few years. New and important facts were established; and, what was almost of as much consequence, errors which had usurped the place of truth were dethroned.

In the programme, examples are given of a few subjects of original research to which the attention of the Institution may be turned. I will mention one in this place, which, in connection with the contents of our first memoir, may deserve immediate attention. I allude to a small appropriation made annually for researches with reference to the remains of the ancient inhabitants of our country. This is a highly interesting field, and what is done in regard to it should be done quickly. Every year the progress of civilization is obliterating the ancient mounds; cities and villages are rising on the spots they have so long occupied undisturbed, and the distinctive marks of these remains are every year becoming less and less legible.

In carrying out the spirit of the plan adopted—namely, that of affecting men in general by the operations of the Institution—it is evident that the principal means of diffusing knowledge must be the *press*. Though lectures should be given in the city in which Smithson has seen fit to direct the establishment of his Institution, yet, as a plan of general diffusion of knowledge, the system of lectures would be entirely inadequate; every village in our extended country would have a right to demand a share of the benefit, and the income of the Institution would be insufficient to supply a thousandth part of the demand. It is also evident that the knowledge diffused should, if possible, not only embrace all branches of general interest, so that each reader might find a subject suited to his taste, but also that it should differ in kind and quality from that which can be readily obtained through the cheap publications of the day. These requisites will be fully complied with

in the publications of the series of reports proposed in the programme. A series of periodicals of this kind, posting up all the discoveries in science from time to time, and giving a well digested account of all the important changes in the different branches of knowledge, is a desideratum in the English language. The idea is borrowed from a partial plan of this kind in operation in Sweden and Germany; and for an example of what the work should be, I would refer to the annual report to the Swedish Academy of its perpetual secretary, Berzelius, on physical science. The reports can be so prepared as to be highly interesting to the general reader, and at the same time of great importance to the exclusive cultivator of a particular branch of knowledge. Full references should be given, in foot-notes, to the page, number, or volume of the work from which the information was obtained, and where a more detailed account can be found. It is scarcely necessary to remark, that the preparation of these reports should be entrusted only to persons pofoundly acquainted with the subjects to which they relate, namely: to those who are devoted to particular branches, while they possess a knowledge of general principles. Sufficient explanations should be introduced to render the report intelligible to the general reader, without destroying its scientific character. Occasionally reports may be obtained from abroad—as, for example, accounts of the progress of certain branches of knowledge in foreign countries; and these may be translated, if necessary, and incorporated into other reports by some competent person in this country.

Besides the reports on the progress of knowledge, the programme proposes to publish occasionally brief treatises on particular subjects. There are always subjects of general interest, of which brief expositions would be of much value. The preparation of these, however, should be entrusted to none but persons of character and reputation, and should be subjected to a revision by competent and responsible judges before they are given to the public. They may be presented in the form of reports on the existing state of knowledge relative to a given subject, and may sometimes consist of memoirs and expositions of particular branches of literature and science, translated from foreign languages. The reports and treatises of the Institution, sold at a price barely sufficient to pay the expense of printing, will find their way into every school in our country, and will be used not as first lessons for the pupil, but as sources of reliable information for the teacher.

The second section of the programme gives, so far as they have been made out, the details of the part of the plan of organization directed by the act of Congress establishing the Institution. The two plans, namely, that of publication and original research, and that of collections of objects of nature and art, are not incompatible, and may be carried on harmoniously with each other. The only effect which they will have on one another is that of limiting the operation of each, on account of the funds given to the other. Still, with a judicious application and an economical expenditure of the income, and particularly by rigidly observing the plan of finance suggested by Dr. Bache, in the construction of the building, much good may be effected in each of the two branches of the Institution. To carry on the operations of the first, a working library will be required, consisting of the past volumes of the transactions and proceedings of all the learned societies in every language. These

are the original sources from which the most important principles of the positive knowledge of our day have been drawn. We shall also require a collection of the most important current literature and science for the use of the collaborators of the reports; most of these, however, will be procured in exchange for the publications of the Institution, and, therefore, will draw but little from the library fund. For other suggestions relative to the details of the library, I would refer you to the annexed communication from Professor Jewett, Assistant Secretary, acting as librarian.

The collections of the Institution, as far as possible, should consist of such articles as are not elsewhere to be found in this country, so that the visitors at Washington may see new objects, and the spirit of the plan be kept up, of interesting the greatest possible number of individuals. A perfect collection of all objects of nature and of art, if such could be obtained and deposited in one place, would form a museum of the highest interest; but the portion of the income of the bequest which can be devoted to the increase and maintenance of the museum will be too small to warrant any attempt towards an indiscriminate collection. It is hoped that, in due time, other means may be found of establishing and supporting a general collection of objects of nature and art at the seat of the general government, with funds not derived from the Smithsonian bequest. For the present, it should be the object of the Institution to confine the application of the funds, first, to such collections as will tend to facilitate the study of the memoirs which may be published in the Contributions, and to establish their correctness; secondly, to the purchase of such objects as are not generally known in this country, in the way of art, and the illustration of antiquities, such as models of buildings, &c.; and, thirdly, to the formation of a collection of instruments of physical research, which will be required both in the illustration of new physical truths and in the scientific investigations undertaken by the Institution.

Much popular interest may be awakened in favor of the Institution at Washington, by throwing the rooms of the building open on stated evenings during the session of Congress, for literary and scientific assemblies, after the manner of the weekly meetings of the Royal Institution in London. At these meetings, without the formality of a regular lecture, new truths in science may be illustrated, and new objects of art exhibited. Besides these, courses of lectures may be given on particular subjects by the officers of the Institution, or by distinguished individuals invited for the purpose.

Commencement of the operations of the Institution.

I was authorized, in connexion with the Committee on Organization, to commence the publication of the Smithsonian Contributions to Knowledge, and to receive any memoir which might be presented on any subject, provided it was found, on examination, to furnish an interesting addition to the sum of human knowledge, resting on original research. The first memoir presented, and found to be of the character prescribed by the resolution of the Board, was one on the remains of the ancient inhabitants of the North American continent. It contains

the result of several years' labor in the survey and exploration of the mounds and earthworks of the Mississippi valley, and will furnish a highly interesting addition to the antiquities of our country, which could not have been given to the world but for the timely aid extended to it by this Institution. The memoir was referred to the American Ethnological Society, with a request that a committee of its members might be appointed to examine and report on its character, as to fitness for publication in the Smithsonian Contributions to Knowledge. On the favorable report of this committee, and on the responsibility of the society, the memoir has been accepted for publication. The following correspondence will serve to give an account of the work, and to illustrate the manner in which it is proposed to submit the papers which may be presented for publication to a commission of competent judges.

CORRESPONDENCE RELATIVE TO THE ACCEPTANCE FOR PUBLICATION OF THE ETHNOLOGICAL MEMOIR OF MESSRS. SQUIER AND DAVIS.

From Messrs. Squier and Davis to the Secretary of the Smithsonian Institution.

CHILLICOTHE, OHIO, *May* 15, 1847.

DEAR SIR: It is proposed in the recognised plan of organization of the Smithsonian Institution, of which you are the executive officer, to publish, under the title of "*Smithsonian Contributions to Knowledge*," such original papers and memoirs "as shall constitute valuable additions to the sum of human knowledge." Under the belief that it falls legitimately within the scope of the above plan, the undersigned herewith submit for acceptance and publication, subject to the prescribed rules of the Institution, a MS. memoir, entitled "ANCIENT MONUMENTS OF THE MISSISSIPPI VALLEY, *comprising the results of Extensive Original Surveys and Explorations:* by E. G. Squier and E. H. Davis." The extent of these investigations, and their general character, are sufficiently indicated in the prefatory remarks to the volume.

With high consideration, we are truly yours,

E. GEO. SQUIER,
E. H. DAVIS.

JOSEPH HENRY, Esq.,
Secretary Smithsonian Institution.

From the Secretary of the Smithsonian Institution to the President of the American Ethnological Society.

WASHINGTON, *June* 2, 1847.

DEAR SIR: I am authorized by the Regents of the Smithsonian Institution to publish, in the numbers of the "*Smithsonian Contributions to Knowledge*," any memoir which may be presented for this purpose, provided that, on careful examination by a commission of competent

judges, the memoir shall be found to furnish a new and interesting addition to knowledge, resting on original research. The accompanying memoir, entitled "*Ancient Monuments of the Mississippi Valley*," &c., having been presented for publication, I beg leave to refer the same, through you, to the American Ethnological Society, with a request that a committee of the members may be appointed to examine and report on its character, in reference to the particulars above mentioned. If the report of the committee is favorable, the memoir will be accepted for publication; full confidence being placed in the ability of the committee to judge of the character of the article, and in their caution in making up their opinion.

I have the honor to be, very respectfully, your obedient servant,

JOSEPH HENRY,
Secretary Smithsonian Institution.

Hon. ALBERT GALLATIN,
President American Ethnological Society.

Extracts of a letter from the President of the American Ethnological Society to the Secretary of the Smithsonian Institution.

NEW YORK, *June* 12, 1847.

"DEAR SIR: I have the honor to enclose a copy of the proceedings and resolutions of the New York Ethnological Society upon the MS. work on American antiquities, by Messrs. E. G. Squier and E. H. Davis, submitted with your letter of the 2d instant.

"I approve entirely of the resolutions and recommendations of the society.

* * * * * * * * * * *

"Whatever may be the intrinsic value of the remains of former times which are found in the United States, it is necessary that they should at least be correctly described, and that existing gross errors should be corrected; and I repeat my conviction that, though ardent, Messrs. Squier and Davis are animated by that thorough love of truth which renders their researches worthy of entire confidence.

* * * * * * * * * * *

"I have the honor to be, &c.,

"ALBERT GALLATIN.

"Prof. J. HENRY,
"*Secretary of Smithsonian Institution.*"

At a regular meeting of the American Ethnological Society, held at the house of the Hon. Albert Gallatin, on the evening of the 4th of June, the president laid before the members a communication from Professor J. Henry, Secretary of the Smithsonian Institution, transmitting, for the examination and opinion of the society, a MS. work on the Ancient Aboriginal Monuments of the United States. On motion, the letter and accompanying MS. were referred to a committee consist-

ing of Edward Robinson, D. D., John R. Bartlett, Professor W. W. Turner, Samuel G. Morton, M. D., and Hon. George P. Marsh, to report upon the same. At a subsequent meeting of the society, this committee submitted the following report and resolutions, which were unanimously accepted and adopted:

REPORT.

The committee of the American Ethnological Society, to which was referred the communication of the Secretary of the Smithsonian Institution, transmitting a manuscript work, entitled "ANCIENT MONUMENTS OF THE MISSISSIPPI VALLEY, *comprising the results of Extensive Original Surveys and Explorations*," by E. G. Squier and E. H. Davis, beg leave to report:

That they have examined the work in question, and regard it not only as a new and interesting, but as an eminently valuable addition to our stock of knowledge on a subject little understood, but in which is felt a deep and constantly increasing interest, both in our country and abroad. In their judgment, the work is worthy of the subject, and highly creditable to the authors. Its chief features are, a scientific arrangement, simplicity, and directness of statement, and legitimate deduction from facts, while there is no attempt at mere speculation or theory. If published, it will be an enduring monument to connect the names of the investigators in honorable and lasting remembrance with the great subject of American Archæology.

The existence and progress of these investigations were made known to the society by correspondence early in the year 1846; and in June of that year specimens of the relics recovered, accompanied by numerous maps and plans of ancient earthworks and sectional views of the mounds from which the remains were taken, were laid before the society by Mr. Squier in person. These excited deep interest and surprise in all who saw them; and the society immediately took measures to encourage further investigation, and secure the publication, under its own auspices, of the important results already obtained. A few months later, the chairman of the present committee, being in Ohio, was enabled, through the kindness of Messrs. Squier and Davis, to visit several of the more important monuments in the immediate vicinity of Chillicothe, and, among these, "Mound City," so-called, from which very many of the minor relics and specimens were procured. He was struck with the accuracy of the plans and drawings, as well as of the accounts which had been laid before the society, and bears full testimony to the fidelity and integrity with which the process of investigation and delineation has been conducted.

During the last and present season the researches of these gentlemen have been actively prosecuted and widely extended, and the above work, largely illustrated, comprising the results, has been prepared. These results are so numerous and important, and consequently such is the extent and magnitude of the work itself, as to put its publication beyond any means which the society can command. Under these circumstances, your committee learn with pleasure that preliminary arrangements have been made for its publication by the Smithsonian

Institution among its "contributions to knowledge." It can only be a matter of sincere gratification to this society to see that which it cannot itself accomplish for the history and antiquities of our country taken up and carried out under such favorable auspices; and they cannot but rejoice that an opportunity is thus afforded to that noble Institution of opening its high career by fostering scientific researches into the interesting problems connected with the ante-Columbian history and aboriginal monuments of our own country.

In view of these facts, your committee would recommend the adoption of the following resolutions by the society:

Resolved, That this society regard the researches of Messrs. Squier and Davis as of very great importance in American Archæology, and as casting much light upon our aboriginal antiquities, especially upon the character and habits of the earliest races which had their seat in the Mississippi valley.

Resolved, That we regard the work prepared upon this subject as one of great general interest, and as worthy to be adopted for publication by the Smithsonian Institution, both as resting on original researches, and as affording remarkable illustrations of the history of the American continent.

Your committee would also append to this report the accompanying letters from Samuel G. Morton, M. D., of Philadelphia, and Hon. George P. Marsh, of Vermont, both members of this society, and joint members of this committee.

All of which is respectfully submitted.

EDWARD ROBINSON,
JOHN R. BARTLETT,
W. W. TURNER,
Committee.

NEW YORK, *June*, 1847.

NEW YORK, *June* 9, 1847.

I have examined with much interest and attention the manuscripts, drawings, and ancient relics in the possession of Mr. E. G. Squier, and am happy to say that my previous impressions concerning the value of the researches of that gentleman and his associate are fully confirmed. It is fortunate for the cause of American Archæology that the first systematic attempt at its elucidation should have been conceived and executed in so truly philosophical a spirit; and rich as this age already is in antiquarian lore, it has, I think, received few more important contributions than that which the enlightened and generous zeal of these two private gentlemen is about to confer upon it. The Smithsonian collections could not begin with a more appropriate or creditable essay; and I hope that every facility may be afforded to the authors in bringing before the public the results of their honorable labors in as suitable a form and with as little delay as possible.

GEO. P. MARSH.

PHILADELPHIA, *June* 8, 1847.

As a member of the committee of the American Ethnological Society, appointed to report on the memoir on American Archæology, by Messrs. E. G. Squier and E. H. Davis, I have great pleasure in saying, that after a careful and repeated inspection of the materials in the hands of those gentlemen, I am convinced they constitute by far the most important contribution to the Archæology of the United States that has ever been offered to the public. The number and accuracy of their plans, sketches, &c., have both interested and surprised me, and it is gratifying to learn that the preliminary arrangements have been made for their publication under the honorable auspices of the Smithsonian Institution.

SAML. GEORGE MORTON.

The memoirs of Messrs. Squier and Davis will occupy the greater portion, if not the whole, of the first volume of the Contributions. The illustrations will consist of fifty-five quarto plates of the mounds, earthworks, and maps of the adjacent country; also, of about two hundred wood-cuts, principally delineations of the various articles found in the mounds. Those who consider no branch of knowledge of any value but such as relates to the immediate gratification of our physical wants, have objected to the acceptance of this memoir as one of the first publications of the Institution; but it must be recollected that the will of Smithson makes no restriction in favor of any particular kind of knowledge, and that each branch is, therefore, entitled to a share of his bequest. The ethnological memoir of Messrs. Squier and Davis was the first, of the proper character, presented for publication, and hence it was entitled to the first place in the series of Smithsonian Contributions. Besides this, it furnishes an addition to a branch of knowledge which is at this time occupying the attention of a large class of minds, and which cannot fail to be interesting to every intelligent person who would learn something of the changes to which man has been subjected.

It is proposed to insert in one of the volumes of the Contributions a sketch of the life of Smithson. The materials for this have been collected from the several volumes of the Transactions of the Royal Society, and the scientific journals of the beginning of the present and the latter part of the last century. The first volume will be published as soon as the wood-cuts and plates, now in the course of preparation, are finished.

Besides the memoirs before mentioned, a number of others have been presented, some of which, though apparently of interest, and the product of thought and labor, were not of the character required by the resolution of the Board, and these have either been returned to their authors, or are in the possession of the Secretary. A number of others have also been provisionally adopted, or are in the course of preparation. Some of these are on the most abstruse parts of physical science, and all will do honor to the intellectual character of our country. Though the number of original memoirs which will be found worthy of a place in the Contributions will probably not be large, yet it will, perhaps, be best to set

apart a definite portion of the income of the bequest—as, for example, at present three or four thousand dollars annually—to defray the expense of this part of the plan of increasing knowledge. A considerable portion, however, of the sum thus expended will be returned to the Institution in the form of additions to its library. I may also suggest, in this place, the propriety of the adoption by the Board of a resolution inviting all engaged in original research to send the results of their labors for publication in the Smithsonian Contributions.

The Board also directed me to commence the collection of apparatus; and I accordingly sent orders to Europe, to the amount of twelve hundred dollars, for the purchase of such articles as could not be procured in the United States. Most of the instruments have been received, and will be found of importance not only in the way of original research, but also in illustrating some of the most interesting and recent phenomena of physical science, as well as serving as samples for imitation to the artists of this country. It was thought that these articles would be admitted free of duty, and a petition to this effect was presented to the Secretary of the Treasury; but—though this officer is well known to be much interested in the prosperity of the Institution—such is the nature of the law that the duty could not be remitted.

There is an article of apparatus which, within a few years past, has opened almost a new world of research in the phenomena of life and organization, the use of which is now indispensable in advancing our knowledge of physiology and its kindred branches of science. I allude to the achromatic microscope, to increase the power of which the artists of Germany, France, and England, have vied with each other. On account of the small number of persons who are capable of constructing the proper lenses, the best specimens of this instrument are very scarce in this country, and can be procured only at a great expense. Under these circumstances, it was a matter of much interest to learn, from a source which could be relied on, that an individual in the interior of the State of New York had successfully devoted himself to the study of the microscope, and that he was able to produce instruments of this kind which would compete with the best of those constructed in Europe. In order to do justice to the talents and labors of this person, as well as to furnish the Institution with a valuable instrument of research, I requested him to construct a microscope, to be paid for out of the funds for the purchase of apparatus, provided that a commission, appointed by myself, should find it capable of producing certain effects. This proposition was accepted, and the result will probably be given to the Board at the next meeting.

Preparations have also been made for instituting various lines of physical research. Among the subjects mentioned by way of example in the programme for the application of the funds of the Institution is terrestrial magnetism. I need scarcely say that this is a subject of high interest not only in a theoretical point of view, but also in its direct reference to navigation and the various geodetical operations of civil and military life. A resolution of Congress authorizing the exploration of the mineral lands adjacent to the great lakes has given to us the means of advancing this branch of knowledge with but little expenditure of the funds of the Institution. The Secretary of the Treasury readily agreed

to the proposition that there should be added to the mineralogical and geological surveys of these regions, determinations of the dip, the variation, and the intensity of the magnetic forces, provided that the Smithsonian Institution would furnish one set of the instruments, and take charge of the direction of the observations, and of reducing and publishing them. In the survey of the mineral lands in the vicinity of Lake Michigan, under Dr. Jackson, Dr. Locke, of Cincinnati, has been employed with his own apparatus; and, to make provision for the survey in Wisconsin, preliminary steps have been taken to procure other instruments from London.

Another subject of research mentioned in the programme, and which has been urged upon the immediate attention of the Institution, is that of an extensive system of meteorological observations, particularly with reference to the phenomena of American storms. Of late years, in our country, more additions have been made to meteorology than to any other branch of physical science. Several important generalizations have been arrived at, and definite theories proposed, which now enable us to direct our attention, with scientific precision, to such points of observation as cannot fail to reward us with new and interesting results. It is proposed to organize a system of observations which shall extend as far as possible over the North American continent; and in order to do this, it will be necessary to engage the co-operation of the British government. I have accordingly addressed a letter to Lieutenant Colonel Sabine, Corresponding Secretary of the Royal Society, who assures me that, as soon as the plan is fully matured for this country, there will be no difficulty in establishing a system of corresponding observations in the British provinces. I have also addressed letters to several gentlemen distinguished for their attainments in meteorology, asking for suggestions as to the plan of observation; and I beg leave to refer the Board to the accompanying report of Professor Loomis, of New York University, and also to the communication of Professor Espy, received in answer. The former contains an exposition of the advantages which may be derived from the study of meteorology, and what has been done in this branch of science in this country, and what encouragement there is for the further prosecution of the same subject, together with a general plan of operations. The present time appears to be peculiarly auspicious for commencing an enterprise of the proposed kind. The citizens of the United States are now scattered over every part of the southern and western portion of North America, and the extended lines of telegraph will furnish a ready means of warning the more northern and eastern observers to be on the watch for the first appearance of an advancing storm.

All which is respectfully submitted.

JOSEPH HENRY, *Secretary.*

To the REGENTS *of the Smithsonian Institution.*

REPORT

OF THE

COMMITTEE OF THE AMERICAN ACADEMY OF ARTS AND SCIENCES

APPOINTED TO

CONSIDER THE PLAN PROPOSED FOR THE ORGANIZATION OF THE SMITHSONIAN INSTITUTION.

SUBMITTED TO THE ACADEMY, DECEMBER 7, 1847.

The Committee of the American Academy of Arts and Sciences, to whom was referred a letter of Professor Henry, of the 30th September, together with the *programme* of the organization of the Smithsonian Institution accompanying the said letter, have had the same under consideration, and beg leave to submit the following report:

Professor Henry is understood to be desirous of ascertaining the opinions of the scientific bodies of the country on the subject of the proposed organization of the Smithsonian Institution; and the free expression of their views is invited by him.

The interesting nature and high importance of this foundation, and the novel and peculiar circumstances attending its establishment, make it highly expedient, in the opinion of the committee, that every step taken in its organization should be deliberately considered. They think it no more than just to express their satisfaction, that the control of the infant establishment has been placed in the hands of a Board of Regents of the highest intelligence, respectability, and weight of character; and in the wise selection made of the officers on whom the active executive duties of the Institution will devolve, the committee perceive a satisfactory pledge as far as they are concerned.

Professor Henry's *programme* commences with "General considerations which should serve as a guide in adopting the plan of organization." He points out the nature of the bequest as made to the United States for the purpose of founding at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men. The bequest is accordingly for the benefit of mankind. The government of the United States is but a trustee to carry out this noble design. Even the people of the United States are interested only so far as they constitute one of the great families of the human race.

The objects of the Institution are twofold: first, the increase; and second, the diffusion of knowledge; objects which, although frequently in a vague way confounded with each other, (inasmuch as it often happens that knowledge is diffused by the same acts which increase it,) are nevertheless logically distinct, and require to be separately regarded. No particular kind of knowledge is specified by the founder as entitled

to preference; all branches are entitled to a share of attention; and the order and degree in which they are cultivated must be decided by a wise regard to means and circumstances. Knowledge may be increased by various modes of encouraging and facilitating the discovery of new truths; it is diffused chiefly, though not exclusively, through the instrumentality of the press. The organization should be such as to produce results not within the province of the existing institutions of the country. It was, for instance, evidently not the design of the liberal founder to establish a collegiate institution or a place of education, nor would it be wise to appropriate his bequest for such an object, already sufficiently attained by the ordinary resources of public and private liberality. Considering the novelty of the undertaking, it would be manifestly unwise to stake too much on the success of the first efforts. The organization should be such as to admit of changes and modifications under the light of experience. As several years have elapsed since the fund came into the possession of the United States, it seems no more than equitable that a considerable portion of the accruing interest should be added to the principal, to make up for the loss of time. The committee consider this suggestion as perfectly reasonable, and trust it will receive the favorable consideration of Congress. Liberal as is the original bequest, the sum is but small compared with the great objects to be accomplished. This consideration suggests the absolute necessity of economy in any outlay on buildings and fixtures; in reference to which a prudent regard must be had, not merely to the first cost, but to the future expenses of repairs, and the support of the establishment. Great care must be taken not to multiply the number of persons to be permanently supported by the Institution. A clear and settled idea of its organization and mode of operation must precede the adoption of a plan of building; lest after the completion of a costly edifice it should be found nearly or quite useless, or worse than useless, by forcing a character upon the Institution which would not otherwise have been given it. All view to mere local ornament or advantage should be discarded at the outset, in the management of a trust created for the benefit of mankind.

Such, very slightly expanded in a few of the propositions, are the general considerations proposed by Professor Henry as guides in adopting a plan of organization. They command the entire assent of the committee, and none of them more so than those which refer to the necessity of strict economy in the expenditure of the fund on a building, and the exclusion of undue regard to local ornament. It would not be difficult to point to a memorable instance in which the most munificent bequest ever made for the purposes of education has been rendered comparatively unavailing, in a sister city of the Union, by the total disregard of these wise principles. It is an additional reason for observing them, that the attempt to erect a highly imposing building for local ornament will not only crush in the bud all hope of fulfilling the ulterior objects of the bequest, but will be almost sure to fail of a satisfactory result, as far as the edifice itself is concerned.

The Secretary's plan of organization in reference to the increase of knowledge is so accurately digested and so thoroughly condensed, that the committee think it would be best to quote his own words:

"To INCREASE KNOWLEDGE, it is proposed—

"1st. To stimulate men of talent to make original researches, by offering suitable rewards for memoirs containing new truths; and,

"2d. To appropriate annually a portion of the income for particular researches under the direction of suitable persons."

These methods of *increasing knowledge* are further unfolded in the following "detail of the plan" for that purpose:

"I. *By stimulating researches.*

"1st. Rewards, consisting of money, medals, &c., offered for original memoirs on all branches of knowledge.

"2d. The memoirs thus obtained to be published in a series of volumes in a quarto form, and entitled 'Smithsonian Contributions to Knowledge.'

"3d. No memoir on subjects of physical science to be accepted for publication which does not furnish a positive addition to human knowledge; and all unverified speculation to be rejected.

"4th. Each memoir presented to the Institution to be submitted for examination to a committee of persons of reputation for learning in the branch to which the memoir pertains, and to be accepted for publication only in case the report is favorable.

"5th. The commission to be chosen by the officers of the Institution, and the name of the author, as far as practicable, concealed until a favorable decision shall have been made.

"6th. The volumes of the memoirs to be exchanged for the transactions of all literary and scientific societies, and copies to be given to all the colleges and principal libraries in this country. One part of the remaining copies may be offered for sale, and the other carefully preserved to form complete sets of the work to supply the demand from new institutions.

"7th. An abstract or popular account of the contents of these memoirs should be given to the public through the annual report of the Regents to Congress.

"II. *By appropriating a portion of the income annually to special objects of research, under the direction of suitable persons.*

"1st. The objects and the amounts appropriated to be recommended by counsellors of the Institution.

"2d. Appropriation in different years to different objects, so that in course of time each branch of knowledge may receive a share.

"3d. The results obtained from these appropriations to be published with the memoirs before mentioned, in the volumes of the Smithsonian Contributions to knowledge.

"4th. Examples of objects for which appropriations may be made:

"(1.) System of extended meteorological observations, for solving the problem of American storms.

"(2.) Geological, magnetical, and topographical surveys, to collect materials for a physical atlas of the United States.

"(3.) Solution of experimental problems, such as weighing the earth, new determination of the velocity of electricity and light, chemical analyses of soils and plants, collection and publication of articles of science accumulated in the offices of the government.

"(4.) Institution of statistical inquiries, with reference to physical, moral, and political subjects.

"(5.) Historical researches and accurate surveys of places celebrated in history.

"(6.) Ethnological researches, particularly with reference to the present races of men in North America; also, explorations and accurate surveys of the mounds and other remains of the ancient people of our country."

The committee have made this long extract from Professor Henry's *programme* in order to give to the Academy an adequate idea of the proposed plan, as far as it refers to the first branch, or the *increase of knowledge*. It has, in some of its features, been already adopted. It is already announced that one voluminous memoir, copiously illustrated by engravings, is already on its passage through the press, under the auspices of the Smithsonian Institution. The committee refer to an elaborate memoir, by Messrs. Squier and Davis, on the aboriginal mounds discovered in large numbers in various parts of the United States, and especially in the region northwest of the Ohio. This memoir was accepted on the favorable report of the Ethnological Society of New York, to which it had been referred by the Secretary of the Institution, and in whose Transactions an abridgment of it has appeared. It is also understood that a memoir on one of the most interesting subjects which engages the attention of geometers and mathematicians at the present moment, viz: the planet Neptune, has been invited by the Secretary from one of our own members.

While the committee would deprecate all attempts unduly to stimulate the increase of knowledge as sure to prove abortive, and to result at best in the publication of crude investigations, they believe it quite possible to remove some of the obstructions to its progress. Narrow circumstances are too apt to be the lot of genius when devoted to scientific pursuits; and the necessity of providing for personal and domestic wants too often absorbs the time and faculties of those who might, if relieved from cares of this kind, have adorned their age and benefited mankind. To such men a moderate pecuniary advantage derived from a successful investigation, might be of vast importance. The efficacy of market upon production is not limited to the creations of physical labor. It is seen in the history of science and literature of every age and country. Invention in the mechanical arts and skill in practical science are well paid in this country, and how great is the harvest! The extraordinary effect even of an honorary inducement is seen in the case of the medal offered by the King of Denmark for the discovery of Telescopic Comets. On these principles it may be hoped that by offering a moderate pecuniary compensation for researches of real merit, valuable contributions to knowledge will be produced; while their publication will tend directly to the diffusion of knowledge.

An encouragement somewhat similar towards the promotion of the increase of knowledge would be afforded by another part of the proposed operations—that of providing the requisite apparatus and implements, and especially books, to be placed in the hands of those engaged in particular lines of investigation. In this way it is not unlikely that a considerable amount of talent may be rendered effective, which at

present is condemned to inactivity from local position unfavorable to scientific research.

It is not the purpose of the committee to engage in minute criticism of the details of the *programme;* but it may not be out of place to suggest a doubt of the practicability or expediency of carrying into rigid execution "the rejection of all unverified speculations," as proposed in the third paragraph of the first section above cited; while it is obviously advisable to discountenance all theoretical speculations not directly built upon observation, it might be too much to exact, in all cases, that these speculations should have been actually verified. No small portion of modern geology is an ingenious structure of speculative generalizations. The undulatory theory of light can hardly claim any other character. The nebular theory, though proposed and illustrated by the highest astronomical talent of the past and present generation, is rapidly sinking from the domain of accredited speculations. It may be doubted even whether M. Le Verrier's brilliant memoirs on the perturbations of Uranus would not, as published before the discovery of Neptune, have fallen within this principle of rejection rigorously applied. Upon the whole, the committee think very favorably of all parts of the plan for increasing knowledge, and feel no doubt that it would afford important encouragement to scientific pursuits. To suppose that it will create an era in science, or throw into the shade the ordinary educational and intellectual influences at work in the country, would be extravagant. It is enough, and all that can be expected, if it be a rational plan for appropriating moderate means towards the attainment of a desirable end.

To fulfil the other object of the trust, viz: to "diffuse knowledge," the Secretary proposes to publish "A Series of Reports, giving an account of the new discoveries in science, and of the changes made from year to year in all branches of knowledge not strictly professional." These reports are to be prepared by collaborators, most eminent in their several departments, who are to receive a compensation for their labors; the collaborators to be furnished with all the journals and other publications necessary to the preparation of their reports.

The following enumeration of the proposed subjects of these reports will afford the Academy a full conception of this part of the plan.

I. *Physical class.*

1. Physics, including Astronomy, Natural Philosophy, Chemistry, and Meteorology.
2. Natural History, including Botany, Zoology, and Geology.
3. Agriculture.
4. Application of Science to Art.

II. *Moral and Political class.*

5. Ethnology, including particular History, comparative Philology, Antiquities, &c.
6. Statistics and Political Economy.
7. Mental and Moral Philosophy.
8. A Survey of the Political Events of the World, Penal Reform, &c.

III. *Literature and the Fine Arts.*

9. Modern Literature.
10. The Fine Arts, and their application to the Useful Arts.
11. Bibliography.
12. Obituary notices of distinguished individuals.

Another branch of the plan for the diffusion of knowledge contemplates the offer of premiums for the best essays on given subjects.

The publications of the Institution, of whatever form, are proposed to be presented to all the colleges, and to the principal libraries and scientific institutions throughout the country, and to be exchanged for the transactions of all scientific and literary societies throughout the world; thus laying the foundation of a valuable library. An adequate number are to be preserved to supply the future demand of new institutions, and the remainder are to be placed on sale at a price so low as to render them generally accessible.

For carrying out the plan thus sketched for increasing and diffusing knowledge, the Regents propose to appropriate one half of the income of their fund. The remainder is to be expended in the formation and maintenance of *a library, a collection of instruments of research in all branches of experimental science, and a museum.*

This partition of the income of the fund is stated to be "a compromise between the two modes of increasing and diffusing knowledge."

A library is one of the objects contemplated in the act of Congress establishing the Board for the management of the trust. It is requisite for carrying out the plan above proposed. At the same time, it will be observed that the distribution, by exchange, of the publications, which that scheme of operations will call into existence, will rapidly provide the Institution, without further expense, with the class of works, often of a costly character, which are most directly important as the means of advancing and diffusing positive knowledge. It is accordingly in these that the Secretary proposes to lay the foundations of the library, forming, 1. A complete collection of the transactions and proceedings of all the learned societies in the world; and, 2. A similar collection of all the current periodical publications, and other works necessary in preparing the contemplated periodical reports.

In the next place, it is proposed to procure by preference those books which are not found in the other public libraries of the United States; regarding the want of them as one of more urgency to be supplied than that of a symmetrical and proportionate collection of books in all the departments of science. Such a library as the plan proposes may be fairly regarded as an important instrument for the increase and diffusion of knowledge.

The collection of scientific apparatus and instruments of research is no less needful in the furtherance of the above mentioned plan, which, as it proposes to aid individuals in the prosecution of important researches, may often do so most effectually by the loan of the instruments required for a particular investigation. They will also be needed, especially at Washington, for carrying out, under the most advantageous circumstances, the various experimental investigations in Physics al-

ready pursued by the Secretary with such credit to himself, and such honor to the scientific character of the country.

The Smithsonian Institution is also to be entrusted with the conservation of a National Museum, Congress having, by a clause in the Act of Incorporation, devolved upon it the charge of the immense collections belonging to the public, of which those brought home by Captain Wilkes from the Exploring Expedition form the greater portion, but which are daily increasing from many other sources. These collections, when a proper and convenient place shall have been prepared for their reception and preservation, are likely to accumulate with still greater rapidity in time to come.

While there is an obvious propriety and convenience in thus entrusting the care of the public collections to the officers of the Smithsonian Institution, it will not, the Committee trust, be forgotten by Congress that the income of the Smithsonian bequest—moderate at best, and consecrated to an object distinct as it is elevated—ought not to be burdened with the cost of constructing an edifice for the reception and exhibition of the public collections, or of their preservation and care. These objects would alone absorb a considerable portion of the fund. If drawn upon to carry them into effect, its efficiency for any other purpose will be seriously diminished, if not altogether destroyed.

The plan also contemplates a museum of the fine arts as well as a scientific apparatus. It proposes to procure "casts of the most celebrated articles of ancient and modern sculpture" and "models of antiquities." While it is undoubtedly true that a gallery of this description would find an appropriate place in an establishment devoted to the increase and diffusion of knowledge in its broadest sense, the Committee cannot but hope that the *immediate* execution of this part of the plan will not be attempted; but that it will be deferred till other objects of more decided utility have been provided for, and until a surplus of unappropriated funds shall have accrued.

The Academy will perceive that the most novel and important feature of the plan is that which proposes to insure the publication of memoirs and treatises on important subjects of investigation, and to offer pecuniary encouragement to men of talent and attainment to engage in scientific research. It is believed that no institution in the country effects either of these objects to any great extent. The nearest approach to it is the practice of the Academy, and other Philosophical Societies, of publishing the memoirs accepted by them. These, however, can rarely be works of great compass. No systematic plan of compensation for the preparation of works of scientific research is known by the Committee to have been attempted in this or any other country. It can scarcely be doubted that an important impulse would be given by the Institution, in this way, to the cultivation of scientific pursuits: while the extensive and widely ramified system of distribution and exchange by which the publications are to be distributed throughout the United States and the world, would secure them a circulation which works of science could scarcely attain in any other way.

It is an obvious characteristic of this mode of applying the funds of the Institution, that its influence would operate most widely throughout

the country; that locality would be of comparatively little importance as far as this influence is concerned; and that the Union would become, so to say, in this respect, a great school of mutual instruction.

The Committee would remark, in conclusion, that in a plan of operations of this kind, very much depends upon the activity and intelligence with which it is administered. The characters of the Board of Regents are a sufficient warrant for the prudence and good judgment which will watch over the general interests of the foundation; while the reputation of the Secretary and his assistant, the librarian, is so well established in their respective departments, as to render any tribute from the Committee entirely superfluous.

All which is respectfully submitted by the Committee.

EDWARD EVERETT,
JARED SPARKS,
BENJAMIN PIERCE,
HENRY W. LONGFELLOW,
ASA GRAY.

DECEMBER 4, 1847.

Read at a meeting of the Academy held December 7, 1847, and accepted.

Ordered to be communicated to the Secretary of the Smithsonian Institution.

O. W. HOLMES,
Recording Secretary.

SECOND ANNUAL REPORT

Of the Secretary of the Smithsonian Institution, giving an account of the operations of the year 1848. *Presented December* 13, 1849.

GENTLEMEN: By a resolution of the Board of Regents, at their last annual meeting, I was charged with the execution of the details of the programme which had been provisionally adopted, and was directed to report annually to the Board the progress made in the execution of the duty assigned to me. In accordance with this resolution, I present the following statement of the operations of the past year.

The programme of the plan of organization of the Institution has been submitted to a number of literary and scientific societies, and in every case has received their unqualified approbation. The principal officers of these societies have expressed a willingness to co-operate with the Smithsonian Institution in carrying out the plans which have been adopted, and it is confidently believed, that as soon as these are fully developed and brought into practical operation, they will meet with general approval.

It was recommended in my last report that the details of the plan should be adopted provisionally, and should be carried into operation gradually and cautiously, with such changes, from time to time, as experience might dictate. The Institution is not one of a day, but is designed to endure as long as our government shall exist; and it is therefore peculiarly important that in the beginning we should proceed carefully and not attempt to produce immediate effects at the expense of permanent usefulness. The process of increasing knowledge is an extremely slow one, and the value of the results of this part of the plan cannot be properly realized until some years have elapsed. Independently of these considerations, the financial arrangements adopted by the Board of Regents are such as to prevent the full operation of the Institution until after three years from next March; up to that time more than one half of the income is to be devoted to the erection of the building, and indirectly to the increase of the permanent fund.

It will be recollected that the programme embraces—

1st. The plan of publishing original memoirs on all branches of knowledge, in a series of quarto volumes.

2d. The institution of original researches under the direction of competent persons.

3d. The publication of a series of reports from year to year, giving an account of the progress of the different branches of knowledge.

4th. The formation of a library and a museum of objects of nature and art.

Publication of original memoirs.

The first volume of the Smithsonian Contributions to Knowledge has been published and partially distributed. It consists of a single memoir on the Ancient Monuments of the Mississippi Valley, comprising

the results of extensive original surveys and explorations by E. G. Squier, A. M., and E. H. Davis, M. D. It is illustrated by forty-eight lithographic plates, and by two hundred and seven wood engravings. The mechanical execution of the volume will bear comparison with that of any publication ever issued from the American press.

In the publication of the first volume of the Contributions, the question occurred as to the propriety of securing the copyright to the Institution. I had not an opportunity of conferring with the Executive Committee on this point, and was therefore obliged to settle it on my own responsibility. I concluded that it would be more in accordance with the spirit of the Institution to decide against the copyright. The knowledge which the Smithsonian Institution my be instrumental in presenting to the world should be free to all who are capable of using it. The republication of our papers ought to be considered as an evidence of their importance, and should be encouraged rather than prohibited.

The first memoir occupies an entire volume, and this accidental circumstance has given rise to a misconception of the plan. It has been supposed that each volume of the Smithsonian Contributions is, in like manner, to consist of a separate treatise on a particular subject selected with a view to popular interest. But such is not the case; each volume will generally contain a number of separate memoirs, on different branches of knowledge, similar to the usual published transactions of learned societies. The only reason why the first volume is occupied with a subject of general interest, rather than one on some more abstruse branch of science, is, that the memoir it contains was the *first* which was presented of the character prescribed by the plan. No preference is to be given to any branch of knowledge. The only questions to be asked, in considering the acceptance of a memoir, are, whether it is a positive addition to knowledge, resting on original research, and of sufficient importance to merit a place in the Smithsonian Contributions.

The rules adopted for the acceptance of a memoir are the same as those generally followed by learned societies. The memoir is surrendered by the author to the Institution, and no additions or alterations are allowed to be made after it has been submitted to the commission appointed to examine it, unless by their consent. A certain number of copies is presented to the author for distribution, with the privilege of striking off, at his own expense, additional copies for sale; which in most cases, particularly when the memoir is of popular interest, will be all the remuneration expected by the author.

From what has been said, it will be evident that the papers published in the Contributions cannot generally be of a popular nature. The popular effects to be produced by the Institution are principally those which may be attained by the reports on the progress of the different branches of knowledge, and by the occasional publications in connexion with these of separate treatises on some subject of special interest.

Applications have been made for the first volume of the Contributions from many academies and private institutions; and were our means sufficient, we would be pleased to supply all demands of this

kind. But this is obviously impossible, for they alone would exhaust all the income of the Institution.

Preparations have been made for the publication of the second volume of the Contributions, and a sufficient number of memoirs have been already accepted, or are in preparation, to furnish the materials. Five of these are on astronomical subjects, and afford as important additions to this science as have ever been made to it in this country. Two of them relate to investigations on the new planet Neptune, which are only second in value to the original discovery of this distant member of our system. Abstracts of these have been given to the world, and have been received with general approbation. A third is a determination of the zodiac of the asteroids, or the zone in the heavens to which the positions of these small planets are confined. This paper is of much practical importance in facilitating the researches now in progress in different parts of the world relative to the nature of these fragments (as they would seem to be) of a large planet between Jupiter and Mars. It may be at once determined, by an inspection of the table annexed to this paper, whether any star mapped in an old catalogue, and now no longer to be found in the same place, can possibly be one of the asteroids. A fourth paper is an account of a new comet, the discovery of which by an American lady is one of the first additions to science of this kind, so far as I am informed, ever made in this country. The fifth memoir is an account of the Georgetown Observatory, the instruments with which it is furnished, the mode of using them which has been adopted, and the results of the observations which have been made. An important paper is also in process of preparation for the same volume on the gigantic fossil cetacean remains which are found in the southern and western States of the Union.

Other papers are in progress which partake of the character of original researches, since they are, in part, at least, prepared at the expense and under the direction of the Smithsonian Institution. They will be mentioned under the next head.

In a few cases, memoirs have been presented which, though exhibiting research and considerable originality, are not of a character to warrant their adoption as parts of our volumes of Contributions to positive knowledge. The rule given in the programme has been rigidly adhered to, viz: to decline accepting any paper on physical science which consists merely of an unverified hypothesis, however ingenious and plausible such an hypothesis may be. A law of nature is not susceptible of a logical demonstration, like that of a proposition of geometry, but is proved by its fitness to explain old, and to predict new, phenomena. The verification of an hypothesis, as we have stated in the last report, consists in deducing consequences from it, and ascertaining, by a direct appeal to observation or experiment, the truth or falsity of these deductions. Any paper, therefore, on material science, which does not contain original experiments and observations, cannot be admitted as a part of the Contributions to Knowledge. The rule we have adopted is in accordance with the practice of cautious investigators. The law of universal gravitation existed for several years in the mind of Newton as a well conditioned hypothesis before it was given to the world as a verified and established theory. Besides

this, the rules of logic which are employed in discussing the questions of ordinary life are not applicable to the precision of scientific inquiry. The materials in this case, to borrow an expression of an author of celebrity, "must be weighed in the scale of the assayer, and not, like the mixed commodities of the market, on the weight-bridge of common opinion and general usage."

It has been objected to our publishing original memoirs, that in so doing we are merely performing the duties of a learned society. The answer is, that the learned societies in this country have not the means, except in a very limited degree, of publishing memoirs which require expensive illustrations, much less of assisting to defray the cost of the investigations by which the results have been obtained. The real workingmen in the line of original research hail this part of the plan as a new era in the history of American science. The assistance which the Institution will thus render to original research will occupy the place of the governmental patronage of other countries, and will enable true genius, wherever found, to place its productions before the world free of cost, and in a manner most favorable for securing due attention and proper appreciation.

From our experience thus far, I am convinced that, circumscribed as is the class of memoirs accepted by the Institution, we shall have no want of materials to fill at least one quarto volume a year. There has been in our country within the last few years a remarkable increase in the attention given to original research, not only in material science, but in every branch of knowledge susceptible of addition. And this is evinced by the character and variety of the papers which have been presented for publication. The wide difference between the increase of knowledge and its diffusion is beginning to be seen and appreciated, and the time is not far distant when we shall be as distinguished for our additions to science as for its diffusion and application. The revolutions of Europe are not only sending to our shores the choicest specimens of art, but also men of reputation and skill in scientific investigation. Besides this, the present state of France is attended with such an interruption of the ordinary means of scientific publication, that the manuscript volumes on natural history of one of the most distinguished professors of the Jardin des Plantes are offered to us for publication in the Smithsonian Contributions for no remuneration, save a few copies for distribution among friends. Were the Institution fully in operation I should not hesitate, in accordance with the liberality which should characterize an establishment founded on the bequest of a foreigner, to recommend the adoption of these memoirs for publication at the expense of the Institution, and perhaps we might now distribute them through several of our volumes and finish the publication of them in the course of a few years.

Original researches.

The second part of the plan consists in instituting original researches, the results of which are to be published, with the other memoirs, in the volumes of the Smithsonian Contributions. Under this head may be first mentioned the publication of the tables ordered at the last meeting

of the Board, for facilitating the calculation of the time of appearance of occultations of the fixed stars by the moon. The object of these tables is to assist in the accurate determination of the longitude of important places on the continent of North America, and their value has been attested by the recommendation of some of the most distinguished astronomers of this country. The accurate establishment of the longitude of any place renders it a landmark to the surveyor, the geographer, and the astronomer, and furnishes a most important element in determining its relative position on the map of the country. The observation of occultations affords one of the most ready means of solving this most difficult practical problem. The tables were calculated at the expense and under the direction of the Institution, and were sent to all persons known to be interested in practical astronomy, with a request that the observations which might be made in connexion with them might be sent to the Institution for computation, or published in some accessible journal. These tables have been so well received by astronomers, that, with the concurrence of the Executive Committee, I have ventured to order the computation of a set of the same kind on a more extensive scale for the year 1849. Copies of these will be sent to United States officers on the coast of Oregon and California, and will be distributed among all the other observers in this country. They will be found of much practical importance to the corps engaged by the general government in establishing the boundary lines of our new possessions. It is hoped that the remuneration allowed for the labor of computing these tables will not be considered extravagant, when it is mentioned that it has occupied the whole time of Mr. Downes for nearly six months, at the rate of eight hours a day.

With the concurrence of the Executive Committee, I have also published an ephemeris of the planet Neptune, or, in other words, a table indicating its position in the heavens during each day of the present year, by which those interested in astronomy are enabled readily to find the place of the new planet in the heavens, or the direction in which the telescope must be pointed in order to observe it. Copies of this have been sent to all the principal astronomers in the world, and it has received the highest commendation. It was calculated by Mr. S. C. Walker from the orbit deduced by himself, a full account of which forms one of the papers of the second volume of the Contributions. It is the first accurate ephemeris which has ever appeared of this newly discovered member of our solar system.

An appropriation of one thousand dollars was made at the last meeting of the Board for the commencement of a series of meteorological observations, particularly with reference to the phenomena of American storms. According to the estimate of Prof. Loomis, appended to my last report, three thousand dollars will be required for the purpose of reducing this part of our plan to practice. It is hoped that one thousand dollars in addition will be appropriated this year, and an equal sum the next, so that, at the end of that time, we shall be prepared for full operation. At the last session of Congress an appropriation was made for meteorology under the direction of the Secretary of the Navy; and in order that the observations thus established may not interfere with those undertaken by the Smithsonian Institution, that officer has

directed Professor Espy to co-operate with the Secretary of the Institution.

It is contemplated to establish three classes of observers among those who are disposed to join in this enterprise. One class, without instruments, to observe the face of the sky as to its clearness, the extent of cloud, the direction and force of wind, the beginning and ending of rain, snow, &c. A second class, furnished with thermometers, who, besides making the observations above mentioned, will record variations of temperature. The third class, furnished with full sets of instruments, to observe all the elements at present deemed important in the science of meteorology. It is believed that much valuable information may be obtained in this way with reference to the extent, duration, and passage of storms over the country, though the observer may be possessed of no other apparatus than a simple wind-vane.

With the instruments owned by private individuals, with those at the several military stations, and with the supply of the deficiency by the funds of the Smithsonian Institution, it is believed that observations can be instituted at important points over the whole United States, and that, with the observations which we can procure from Mexico and the British possessions of North America, data will be furnished for important additions to our knowledge of meteorological phenomena. As a beginning to this extended system, six sets of instruments have been forwarded to the coast of Oregon and California, for the purpose of establishing periodical observations on the western side of the Rocky mountains. Also, a set has been forwarded to Bent's Fort, and another to Santa Fe. Circulars have been prepared and will shortly be issued for the purpose of ascertaining the number and locality of all those who, with or without instruments, are willing to join in the enterprise. I am indebted to Prof. Coffin, of Lafayette College, for a list of all persons, as far as they are known, who have heretofore been accustomed to make meteorological observations in North America, which will be of much importance in our future investigations relative to this subject.

As a part of the system of meteorology, it is proposed to employ, as far as our funds will permit, the magnetic telegraph in the investigation of atmospherical phenomena. By this means, not only notice of the approach of a storm may be given to distant observers, but also attention may be directed to particular phenomena, which can only be properly studied by the simultaneous observations of persons widely separated from each other. For example, the several phases presented by a thunderstorm, or by the aurora borealis, may be telegraphed to a distance, and the synchronous appearances compared and recorded in stations far removed from each other. Also, by the same means, a single observatory, at which constant observations are made during the whole twenty-four hours, may give notice to all persons along the telegraphic lines, of the occurrence of interesting meteorological phenomena, and thus simultaneous observations be secured. The advantage to agriculture and commerce to be derived from a knowledge of the approach of a storm, by means of the telegraph, has been frequently referred to of late in the public journals. And this, we think, is a subject deserving the attention of the general government.

Under the head of researches, I may mention that several papers are

in preparation, under the direction and partly at the expense of the Institution. The first of these relates to a series of valuable observations on the temperature and velocity of the Gulf stream, the author of which the science of our country was called to mourn while he was engaged in an important public service. The observations are now in progress of reduction, and the results will furnish an interesting memoir for the next volume of our Contributions.

The drawings and engravings of a paper on the botany of Oregon are also in progress; and as a small advance has been made to assist in completing these, the memoir will fall under the head of original researches, in part conducted by the Institution.

In the last report, it was mentioned that a magnetic survey of the mineral regions of the northern lakes had been added to the geological and mineralogical survey, the results of which were to be submitted to the Smithsonian Institution. An appropriation was made by the Secretary of the Treasury during the past summer for a continuation of this survey; but on account of the lateness of the season at which the arrangement was made, the person to whom the work was entrusted was not enabled to engage in it this year. Operations, however, will probably be commenced as soon as practicable next spring.

There is in the Land Office a large collection of facts relative to the variation of the compass, which have been derived from the observations of the public surveyors, who are directed in all cases to note the variation of the needle from the true meridian, at the several stations of their surveys. The observations are made with an instrument called the solar compass, which probably gives the variation at each place within a quarter of a degree of the truth. The number of these observations, it is believed, will make up in a considerable degree for their want of greater precision; and from the whole, the lines of declination may be determined with considerable accuracy. The Secretary of the Treasury has liberally directed that all the matter relating to this subject in the Land Office may be placed at my disposal, and Mr. Wilson has undertaken to present the whole in a series of maps, the publication of which in the Contributions cannot fail to be received as an interesting addition to terrestrial magnetism.

Among the objects of research enumerated in the programme, is the analysis of soils and plants; but it is the policy of the Smithsonian Institution, in order to employ its funds most effectually in the way of increasing and diffusing knowledge, not to engage in any operation which could be as well if not better carried on under the direction and with the funds of another institution. In accordance with this, an arrangement has been made with the Commissioner of Patents that the two Institutions may not interfere with each other; and as, at the request of Mr. Burke, an appropriation has been made by Congress for a series of experiments on the above mentioned subjects, the Smithsonian Institution will, therefore, for the present abandon this field of research for others less effectually occupied.

I may also mention in this connexion, that the Smithsonian Institution has been the means of starting an important literary enterprise, intended to facilitate the study of the history and literature of our country. Mr. Henry Stevens, who has been engaged for a number of years as the

agent in this country of the British Museum, and other European libraries, has commenced the preparation of a bibliographical work, comprising a description of all books relative to, or published in, America prior to the year 1700, and indicating not only the contents and value of the books, but also the principal libraries in this and other countries where they are to be found. The preparation of a work of this kind will be in accordance with that part of our plan which contemplates rendering the Institution a centre of bibliographical knowledge, and will have a direct influence in promoting the objects of the various historical societies which are now established in almost every State of the Union, and in bringing the Institution into friendly relations with them. A certificate has been given to Mr. Stevens to the effect that this work, if found, by a commission to whom it shall be referred, properly executed, will be accepted for publication as part of the Smithsonian Contributions to Knowledge. Assured by this certificate that the work will be properly executed, a number of gentlemen and institutions, whose libraries will be examined and referred to, have liberally subscribed to defray the necessary expense of its preparation. With this encouragement, Mr. Stevens has started for Europe to commence investigations in foreign libraries. To satisfy ourselves as to the importance of a work of this kind, a circular letter was addressed to a number of individuals distinguished for their knowledge of such subjects, and the answer in all cases was highly favorable to the scheme. Some of these answers I have given in the appendix, together with the details of the plan of the work as proposed by Mr. Stevens.

At the last session of Congress an appropriation of $5,000 was made, on motion of Mr. Stanton, for a series of astronomical observations in the southern hemisphere, for the purpose of a new determination of the parallax of the planets, and consequently their distance from the sun, by simultaneous observations on the planets Venus and Mars, made at places situated north and south of the equator. This appropriation has been found inadequate to furnish all the instruments required; and inasmuch as the expedition should not be undertaken unless the observers are provided with all the aids which the latest improvements in modern science can furnish, and since, to wait for an additional appropriation from Congress would cause the delay of a whole year, Lieutenant Gilliss has applied to the Institution to purchase and lend to him an achromatic telescope, which, if not paid for by an additional appropriation from the government, will, after its return from the south, form part of the apparatus of the Institution. This instrument will cost about $2,000, to be paid for at the end of three years. The Executive Committee, to whom I applied for counsel on this subject, agreed with me in opinion, that this was a proper occasion for the application of the funds of the Institution to the promotion of science. The instrument has accordingly been ordered to be constructed by an American artist, and to be accepted only in case its performance shall meet the approval of a commission of practical astronomers appointed to examine it.

The position on the coast of Chili, to be occupied by the southern observers, is peculiarly favorable to the study of the facts connected with one of the most mysterious and interesting phenomena of terrestrial physics—namely, the earthquake. Lieutenant Gilliss has been re-

quested to give particular attention to this subject, and for the purpose of facilitating his inquiries a seismometer, or instrument for measuring the intensity and direction of the *earthwave*, has been ordered at the expense of the Institution, to be placed in charge of the expedition during its absence. The cost of this instrument is not yet ascertained; it will, however, not exceed one hundred and fifty dollars.

I think it highly probable that these instruments will be paid for by the general government. The liberal spirit which dictated the original appropriation will, I doubt not, complete the outfit by the addition of a sum sufficient to defray all the necessary expenses.*

Under the head of original researches, I may call to the Regents the fact of my having been directed to continue my own investigations on physical science, and to report occasionally to the Board my progress therein. In the course of last year I found an opportunity, while at Princeton, to commence a series of investigations on radiant heat, which apparently produced some results of interest, but which my subsequent engagements have prevented me from fully developing. I was also directed to cause to be made a series of experiments on the economical value of building material. It will give me much pleasure to obey this instruction of the Board as soon as a place in the Smithsonian building and the necessary apparatus are procured for properly conducting the research.

Reports on the progress of knowledge.

The Smithsonian Contributions are intended to consist of entirely original additions to the sum of human knowledge, and are to be principally exchanged for the transactions of learned societies, and to be distributed among public institutions. The Reports, on the other hand, are to be of a more popular kind, and are intended for as wide a distribution as the funds of the Institution or the means of publishing them may permit. They will give an account of the progress of the different branches of knowledge in every part of the world, and will supply a desideratum in English literature.

The objects of the Smithsonian Institution are not educational. The press in our country already teems with elementary works on the different branches of knowledge, and to expend our funds in adding to these, would be to dissipate them without perceptible effect. Neither do we believe that the distribution of penny magazines, or tracts on the rudiments of science, can ever supersede the labors of the school-master. As a general rule, knowledge presented in a fragmentary form can only be useful to minds well stored with general principles, to which the isolated facts may be referred; and knowledge, both fragmentary and diluted, is almost worthless, even in the way of popular distribution. The elementary principles of science may be systematically taught to a certain extent in common schools, and the reports we intend to publish will be found of value to the teacher, and through him to the pupil, as well as interesting to the general reader. While these reports are rendered as free as possible from technical terms, they will treat of

* Since writing this report, the appropriation has been made by Congress.

subjects requiring attention and thought to understand them. We think it better that they should be above rather than below the average intelligence of the country; that they should start from a given epoch, and, in most cases, should be preceded by a brief exposition of the previous state of each subject.

Arrangements have been made for commencing some of these preliminary reports, as well as reports on the state of our knowledge of special subjects; among these are:

1. A report on the present state of chemistry as applied to agriculture.
2. A report on the forest trees of North America, giving their economical uses, their mode of propagation, and their history.
3. A report on the present state of our knowledge of lightning and the best means of guarding against accidents from its effects.
4. A report on the late discoveries in astronomy.
5. A report on meteorological instruments, with practical observations and directions with reference to the use of them.

In connexion with this last report, I may mention that a proposition has been made to the Institution by Professor Guyot, of the University of Neufchatel, relative to the importance of commencing at this epoch, and at the beginning of the labors of the Smithsonian Institution, the adoption of the centigrade scale of the thermometer. This is a subject, indeed, worthy of the attention of the Regents. It should, however, be discussed with caution, and be decided only after due deliberation.

The first idea of reports on the progress of knowledge, with which we are acquainted, is due to the Emperor Napoleon, who called upon the French Academy of Sciences to present him with accounts of the progress of the different branches of knowledge within a given period. Until within the last few years the only regular reports of the kind were those presented to the Swedish Academy. Since that time, however, a series of annual reports on chemistry have been commenced by an association of gentlemen in France, and also a series on the different branches of material science, by the Physical Society of Berlin. The several numbers of the latter are now in progress of translation, in order to furnish in part the materials for the reports to be prepared for the Smithsonian Institution during the coming year.

Although comparatively little has been done in our country in the way of original research, yet it might be important that the Institution should call for the preparation of a report on the history of the progress of original science in America down to the end of the present half century. This report would exhibit a constant increase in the number and importance of the researches made in our country, and might be found of much service in giving due credit to the labors of those who have been really engaged in the advance of knowledge among us. A report of this kind, however, would require the association of a number of persons combining literary with scientific attainments.

Occasional publication of separate treatises on subjects of general interest.

This part of the plan of organization requires to be carried into operation with much caution. It is liable to much abuse, unless the pub-

lication be restricted to a well-defined range, viz: to scientific reports on the present state of knowledge of a given subject, to precede the periodical reports; to translations from foreign languages of papers of general interest; and occasionally, perhaps, the exposition of a subject on which, at a particular time, popular knowledge is required. We should be careful not to establish a precedent which may lead us into difficulty, in the way of declining the publication of works which may be presented to us. Scarcely a week passes in which the Institution is not requested to publish some essay or compilation, and the funds which can be devoted to all our publications would not suffice for one-half of those offered of this kind. The only work of this class which has yet been attempted by the Institution, is one entitled "Hints on Public Architecture," under the direction of the Building Committee. Although the Secretary's name was mentioned in the resolution authorizing the publication of this treatise, yet he has thus far had no connexion with it. The publication was authorized before the details of the plan of organization were fully settled. It was at first intended merely as a report of the Building Committee, giving an account of the plans submitted, and the one adopted for the Smithsonian building, together with a report of the investigations of the committee with regard to the materials of construction, &c. It was afterwards changed into the form of a regular treatise, in order that it might be referred to a commission of persons chosen to examine it, and that the Institution might thus be relieved from the responsibility of pronouncing upon its fitness for publication. I think it important that, besides the preface of this work, a full account of its origin should be given in an introductory advertisement.

Library.

During the past year the library has continued to increase by donations, and by the books which have been deposited by publishers, in accordance with the 10th section of the act establishing the Institution. The requirements of this act are, however, not strictly observed by all publishers; and I would direct the attention of the Board to a special report of the Assistant Secretary with reference to this point. The whole subject will probably come before Congress during its present session.

Professor Jewett, the Assistant Secretary, has been industriously engaged during the past year in procuring statistics of the libraries of the United States, and in digesting plans for the details of the library of the Institution, and I beg leave to refer you to the able and interesting report of the results of his labors herewith submitted. A considerable portion of the copies of the Smithsonian Contributions will be presented to public institutions which publish transactions, and which are able to present us in return with additions to our library. The volume now in process of distribution has been preceded by a circular requesting exchanges of the works of all institutions which issue transactions and catalogues of all libraries to which the Contributions may be sent.

Preparation for lecturing.

The plan of organization contemplates a series of free lectures, particularly during the session of Congress. These will be commenced as soon as the building is ready for the purpose. This part of the plan also cannot be put into full operation until after the building is completed. A number of gentlemen have consented to favor us with their services. Men of talents, however, cannot be expected to leave their homes and subject themselves to the expense of visiting Washington, and to the trouble of preparing a course of lectures, without a proper remuneration. It will be necessary, therefore, that an annual appropriation be made for this purpose. The amount, however, must necessarily be small until the building is completed, or until all the interest of the fund can be devoted to the primary objects of the Institution. Besides this, the lecture-room in the east wing, now finished, will scarcely hold more than five hundred persons, while the one in the main building is intended to accommodate twice as many.

Donation.

Dr. Robert Hare, of Philadelphia, having resigned the chair of chemistry in the University of Pennsylvania, which he had filled with honor to himself and his country for nearly thirty years, has presented to the Smithsonian Institution the instruments of research and illustration collected and used by himself during his long and successful scientific career. Many of these instruments are the invention of the donor, are connected with his reputation, and belong to the history of the science of our day. The gift is important, not only on account of its intrinsic value, but also as establishing a precedent of liberality, which we trust will be frequently observed by others, as well as being an expression of Dr. Hare's approbation of the plan and confidence in the stability of the Institution. A number of other donations have been received, of which a list, with the names of the donors, will be given in a subsequent report.

In view of what has been stated in the foregoing report, the Secretary trusts that the Board of Regents will be satisfied, if ever they had any doubts on the subject, that the plan adopted is one well calculated to carry out the benevolent intentions of the donor, of increasing and diffusing knowledge among men; and that a satisfactory answer has been given to the question frequently asked, namely: When is the Institution to begin? It will be seen that it has commenced the most important part of its operations, and the results are now in progress of dissemination in every part of the civilized world.

Respectfully submitted:

JOSEPH HENRY,
Secretary of the Smithsonian Institution.

THIRD ANNUAL REPORT

Of the Secretary of the Smithsonian Institution, for the year 1849.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: In accordance with the resolution that the Secretary shall present at each annual meeting of the Board of Regents an account of the operations of the Institution during the past year, I respectfully submit the following.

Agreeably to the scheme of finance adopted by the Board, the greater portion of all the income of the Smithsonian fund is at present devoted to the erection of the building; and until this is paid for, the money which can be appropriated to the active operations of the Institution will be comparatively small; not only small in proportion to the demands made upon it, but small in reference to the results which the public generally expect it to produce. It is believed, however, that a proper consideration of the facts presented in the following report will warrant the conclusion, that the Institution, during the past year, has been gradually extending its sphere of usefulness, and successfully bringing into operation the different parts of its plan of organization.

It will be recollected that the several propositions of the programme were adopted provisionally, and it is gratifying to be able to state that experience thus far has indicated no important changes. The general plan has continued to receive the approbation of the enlightened public both in this country and in Europe, and to increase general confidence in the power of the Institution to confer important benefits on our country and the world.

In presenting the different operations of the Institution, I shall adopt, as in my last report, the principal divisions of the programme:

1st. Publication of memoirs in quarto volumes, consisting of positive additions to knowledge.

2d. Institution of original researches, under the direction of competent persons.

3d. The publication of a series of reports, giving the present state and progress of different branches of knowledge.

4th. Formation of a library and museum of objects of nature and art.

5th. Lectures.

Publication of Memoirs.

Agreeably to the plan of the Institution, these memoirs are intended to embody the results of researches which could not otherwise be readily published, and are to be distributed to societies, public libraries, and other institutions. An account of the first memoir was given in the last report. It relates to the ancient monuments of the Mississippi valley, and occupies an entire volume. It has been presented, as far as opportunity would permit, to the principal literary and scientific societies of the world, to all the colleges and larger libraries of this country, and has everywhere

been received with much commendation. All the societies from which we have as yet heard, have declared their willingness to co-operate with the Institution, and to give us their publications in exchange, from which source our library has already been enriched with valuable additions.

It is to be regretted that our means would not permit us to distribute the first volume more liberally than we have done, and that the price put upon the copies offered for sale has placed them beyond the reach of many persons desirous of obtaining them. This arose from the fact, that in order to remunerate the authors for the expense and labor bestowed on the memoir, they were allowed to strike off from the types and plates of the Institution an edition to be sold for their own benefit. To avoid risk of loss, the edition was a small one, and the price put at ten dollars. An occurrence of this kind will not happen again; for although it would be desirable to pay authors for their contributions, yet it is now found that materials will be offered, free of all cost, more than sufficient to exhaust the portion of the income which can be devoted to publications.

In printing the future volumes it will be advisable to strike off an extra number of copies for sale on account of the Institution, and to dispose of those for little more than the mere cost of press-work and paper.

The second volume of Contributions is now in the press, and will consist of a number of memoirs which have been submitted to competent judges and found worthy of a place in the Smithsonian publications. In this volume we have adopted the plan of printing each memoir with a separate title and paging. The object of this is to enable us to distribute extra copies of each memoir separately, and also to furnish the author with a number of copies regularly paged for his own use. It will likewise enable us to classify the memoirs according to subjects.

The following is a brief account of the memoirs contained in the second volume, so far as they have been reported on by the commissioners to whom they have been submitted:

1. *A memoir on the planet Neptune, by Sears C. Walker.*—An abstract of this memoir has been published in the proceedings of the American Philosophical Society, and has received the approbation of the scientific world. It presents the several steps of the discovery of an orbit which has enabled Mr. Walker to compute the place of the new planet with as much precision as that of any of the planets which have been known from the earliest times.* Starting from the observations of the motion of the planet during a period of about four months, Mr. Walker calculated an empirical orbit, which enabled him to trace its path among the stars of the celestial vault through its whole revolution of 166 years. He was thus enabled to carry its position backward until it fell among a cluster of stars accurately mapped by Lalande towards the close of the last century; and, after a minute and critical investigation, he was led to conclude that one of the stars observed by Lalande on the night

* It is proper to state that a part of the researches given in this memoir was made during the author's connection with the National Observatory, under the direction of Lieutenant Maury. An account of these will probably soon be published in the next volume of the records of operations of this observatory.

of May 10, 1795, was the planet Neptune. This conclusion was rendered almost certainty by the observation, made on the first clear night, that all the stars in the cluster above mentioned were found in place, except the one previously fixed upon as the new planet. Some hesitation was created, however, by noting that the missing star in Lalande's maps was marked as doubtful. In order to settle this difficulty, the original manuscript of the astronomer deposited in the Observatory of Paris was referred to. It was then found that Lalande had twice observed the same star; and not finding the right ascension and declination each time the same, and not dreaming it was a planet, he selected one of the observations for publication, marking the position indicated doubtful. The planet had moved during the interval of observation, and thus produced the discrepancy. By allowing for the movement during the time elapsed, the two observations precisely agree. There could, therefore, be no longer any doubt that this star, observed and mapped fifty years ago as a fixed star, was in reality the planet Neptune. Mr. Walker, availing himself of this discovery, had now a series of observations embracing not a few months of the motion of the planet, but which carried it back fifty years. From these data he was enabled to deduce a pure elliptical orbit, or one which the body would describe were there no other planets in the system. This orbit has been investigated by another of our countrymen in a series of profound and beautiful researches, adding much to our knowledge both of Neptune and Uranus. I allude to the labors of Professor Peirce, of Cambridge.

It is well known that the planet Neptune was discovered by mathematical deductions from the perturbations observed in Uranus, and that Leverrier and Adams, the independent authors of this discovery, not only pointed out the direction in which the unseen planet was to be found, but also, from *a priori* considerations, gave the dimensions, form, and position of the orbit it describes around the sun. The direction indicated was the true one, but the elements of the orbit were widely different from those subsequently found to belong to the actual orbit of the planet. Professor Peirce submitted the data used by Leverrier and Adams to a new and critical examination, and succeeded in discovering the cause of their error, and of verifying the conclusions of Mr. Walker. He afterwards proceeded to consider the inverse problem, viz: that of deducing the perturbations which Neptune ought to produce in the planet Uranus. His final results gave a perfect explanation of all the anomalies in the motions of Uranus, and furnished the data, for the first time since its discovery in 1781, for correct tables for determining its position in the heavens. Professor Peirce also investigated the action of all the other planets on Neptune, and his results enabled Mr. Walker, by applying them to his elliptical orbit, to compare the actual with the calculated place of the planet. This led to a further correction of the elliptical orbit, and a more perfect table of calculated places. In this way, by a series of profound and beautiful investigations, alternately combining the data of observation with theoretical considerations, these two astronomers have perfected our knowledge of the motion of the most distant planets of our system, and furnished the means of giving their past and future position through all time. The details of Mr. Peirce's paper have not yet been prepared for the press.

They will probably be given in due time to the world as a part of the Smithsonian Contributions.

The investigations mentioned in the foregoing account have been attended with very laborious arithmetical calculations. A small appropriation has been made to defray, in part, the expense of these. Indeed, without the aid thus given, the discoveries we have related would scarcely have been made—at least at this time, and in our country.

2. The next memoir is *An account of the discovery of a Comet by Miss Maria Mitchell, of Nantucket*, with its approximate orbit, calculated by herself. The honor of this discovery has been duly awarded to the author. A medal has been presented to her by the King of Denmark, and the comet itself is now known to astronomers in every part of the world by her name. From the peculiarities of the case, the Executive Committee recommended that a small premium be presented to Miss Mitchell.

3. The third memoir is *On a new method of solving Cubic Equations, by Professor Strong, of New Brunswick, New Jersey;* a purely mathematical paper, which has been pronounced an interesting addition to that branch of science.

4. The fourth memoir is *A contribution to the Physical Geography of the United States.* It presents a section, from actual surveys, of the descent of the bed of the Ohio river from its source, in the State of New York, to its mouth, on the Mississippi. By a series of observations and elaborate calculations, the author exhibits the amount of water which passed down the river during a period of eleven years prior to 1849. This, compared with the amount of rain which fell during the same time on the surface drained by the river, gives a series of interesting results in reference to evaporation.

It also contains a proposition for improving the navigation of the Ohio, founded upon data given in the preceding part of the memoir. Whatever may be the result of the plan here proposed, this memoir has been recommended for publication as a valuable addition to the physical geography of the United States. The author is Charles Ellet, jr., the celebrated engineer of the wire bridges over the Niagara and Ohio rivers. Another memoir is promised by the same author, which will be a continuation of the same subject.

5. The fifth memoir is contributed by Dr. Robert Hare, of Philadelphia, and is intended to elucidate the remarkable phenomena exhibited at the great fire in the city of New York on the 19th of July, 1845, during which two hundred and thirty houses were destroyed, containing merchandise amounting in value to sixty-two millions of dollars. "A series of detonations, successively increasing in loudness, were followed by a final explosion, which tore in pieces the building in which it took place, threw down several houses in its vicinity, and forced in the fronts of the houses on the opposite side of the street." These effects were attributed to gunpowder, though the owner of the building in which the explosion occurred declared that none of this article was present, but that the house contained a large quantity of nitre, in connexion with merchandise of a combustible nature.

This memoir contains a series of investigations relative to the explosions which may be produced by heated nitre in connexion with carbon-

aceous matters. The author shows, by numerous experiments, that explosions of a violent kind can be produced by forcibly bringing into contact at a high temperature, nitre, and substances of an inflammable character. It also contains several new experiments on the combustion of gunpowder under different circumstances.

6. The sixth memoir is *On the Ancient Monuments of the State of New York, by E. G. Squier*, and may be regarded as a continuation of the memoir by Squier and Davis, on the ancient monuments of the Mississippi valley. The expense of the explorations which form the basis of this memoir was two hundred dollars, one half of which was defrayed by the members of the Historical Society of New York, and the remainder by this Institution.

7. Another memoir is by Professor Secchi, a young Italian of much ingenuity and learning, a member of Georgetown College. It consists of a new mathematical investigation of the reciprocal action of two galvanic currents on each other, and of the action of a current on the pole of a magnet. It begins with the assumption that the force between the elements of the currents and the magnet is inversely as the square of the distance, and directly as the sine of the inclination, and then presents the mathematical inferences which legitimately flow from these data. The deductions are of such a nature that the author has been able to verify them by means of well devised experiments, and the results accord as nearly with the deductions as the complex nature of the subject will admit. The investigations involve the mathematical theory of the galvanometer, and the experiments furnish much interesting and useful information, aside from the principal object of the memoir, particularly on the comparative value of different kinds of galvanic batteries.

8. The next paper is by Professor Louis Agassiz, of Harvard University, and is entitled *The Classification of Insects upon Embryological Data*. It gives an account of a series of new and interesting facts observed by the author relative to the metamorphosis of insects, which have an important bearing on general questions in zoology, and which will probably lead to the arrangement of these animals according to a new system of classification, founded upon more definite principles than those heretofore adopted.

9. The next is a memoir by Dr. R. W. Gibbes, on the *Mosasaurus* and some new allied genera of the gigantic lizards which formerly inhabited our planet, and of which the remains are now found in different parts of the United States, particularly in the marl beds of various parts of the country. This is an interesting addition to palæontology, and has received a favorable report from the commission to whom it was referred.

Researches.

The programme of organization contemplates the establishment of researches, under the direction of suitable persons, the expense to be borne in whole or in part by the Institution. In the last report it was mentioned that a telescope and other apparatus had been ordered for Lieutenant Gilliss in his astronomical expedition to Chili, and that, with-

out this assistance, the expedition would have been delayed a year. I am now, however, happy to state that the expense of these instruments has since been paid by an appropriation of Congress; and the Institution has thus been the means of promoting the objects of the expedition without any expenditure of its income. Certain improvements in astronomical instruments, however, have been made since the departure of Lieutenant Gilliss which would much facilitate his observations, and enable him to do much more with his small number of assistants; and it may be well for the Institution to furnish him with instruments of this kind.

Under the head of researches it may also be mentioned that, during the past year, we have caused to be computed, at the expense of the Institution, an ephemeris of Neptune, giving the position of the planet in the heavens from August 4, 1846, to February 4, 1848, and also in the last half years of 1848 and 1849. This ephemeris is based on the orbit of Neptune established by Mr. Walker and corrected by the perturbations of the planet Neptune by the action of Jupiter, Saturn, and Uranus, as deduced from the mathematical investigations of Professor Peirce, of Harvard University.

We have distributed copies of this ephemeris to all persons known to us who are interested in practical astronomy, not only in this country but in Europe. It has been received with high commendation, and is found to give the actual place of the planet in the heavens within the limits of a few tenths of a second of arc; indeed, the coincidence of the calculated and observed places is so marked, that, were the actual planet of the heavens and that of the ephemeris to be considered as a double star, they would have so close a proximity that no telescope yet constructed could separate them.

Occultations for 1850.

A set of tables in continuation of those mentioned in the last and preceding report for facilitating the calculation of the appearance of occultations of fixed stars by the moon during the year 1850 has been prepared by Mr. Downes, of Philadelphia, and published by the Institution. At the last session of Congress an appropriation was made for establishing a Nautical Almanac, which will furnish, among other aids to astronomical observation, sets of tables of the kind just mentioned. Lieutenant Davis, of the United States navy, to whom the superintendence of this national work has been entrusted, recommended that the expense of the preparation of the tables for 1850 should be defrayed from the appropriation for the Almanac; and this recommendation has been concurred in by the Secretary of the Navy. The Institution has, therefore, been called upon merely to pay for the printing and distribution of the tables, and thus again enabled, with a small outlay of its funds, to afford important facilities for the advance of science.

Meteorology.

Under the general head of researches we may also give an account of the progress made in establishing the system of meteorological ob-

servations proposed in the preceding reports. Circulars describing the plan of operation were distributed to the several parts of the Union through members of Congress at the last session, and the results fully equalled our anticipations. From localities widely separated from each other, and distributed over the greater portion of the United States, about one hundred and fifty monthly returns are now regularly received. To carry on this system efficiently, much labor is necessarily required in the way of correspondence; but it bids fair to furnish the Institution with a wide field of usefulness in bringing it into communication with individuals who, though secluded in position, are desirous of improving themselves, as well as of promoting general knowledge. The correspondence we have thus established, and which we hope to extend, through the aid of the members of the present Congress, will enable us to acquire definite information on a variety of subjects besides those which relate to meteorology. We have already accumulated in this way a mass of curious and instructive information, which we hope, in the progress of the development of the plan of the Institution, to digest and present to the public.

We would mention in this connexion that two of our meteorological correspondents have proposed the collection of statistics of diseases, including the rise, progress, and decline of epidemics. This is a subject we would commend to the American Medical Association. The Smithsonian Institution could assist in an enterprise of this kind by receiving the information which is attainable, and collating it, under the direction of a committee of gentlemen belonging to the medical profession.

It will be recollected that our plan of meteorological observations embraces three classes of observers—one to record the changes in the aspect of the sky, the direction of the wind, beginning and ending of rain, snow, &c.; another, in addition, to give an account of the changes of temperature indicated by the thermometer; and a third, furnished with a full set of instruments for recording the most important atmospheric changes. The importance of the information which may be derived from a careful record of the weather without instruments can scarcely be realized by persons who have given but little attention to the subject. The place of origin, direction, velocity of motion of a storm, as well as the direction and velocity of the wind which composes it, whether gyratory or inward and upward, may all be determined by a sufficient amount of data of the kind we have mentioned. Also, a careful record of the observations of meteors seen by individuals from different positions would furnish interesting data for determining the elevation and velocity of these mysterious visitors.

There are other data which can only be obtained by the use of accurate instruments; fortunately, however, a comparatively small number of observers are sufficient for determining these. The instruments should be of the best possible construction, placed in important situations, and observed at suitable times and with undeviating regularity by competent observers. Few persons are acquainted with the difficulty of procuring accurate meteorological instruments. The ordinary thermometers for sale in the shops frequently differ several degrees from each other, particularly at the higher and the lower temperatures, and even the same thermometer is liable, for a time after its construction, to undergo a

change in the size of the bulb, and thus to derange the accuracy of the scale. An accurate barometer is another instrument which cannot readily be obtained, unless at too great a price for the means of ordinary observers. The common weather-glasses, sold under the name of barometers, though they may be of use in indicating variations of atmospheric pressure, and thus assist in furnishing data for determining the progress of aerial waves, are inapplicable to the precise and accurate observations necessary to determine the minute changes of atmospheric pressure, or to ascertain the height of places above the level of the sea.

Considerable pains have been taken during the past year to ascertain the best form of a barometer, which could be procured at a reasonable cost; and, after considerable inquiry and comparison of different instruments, we have at length decided upon one, with an adjustable cistern and enclosed in a brass case, which may be transported to a distance, and will serve as well for a mountain barometer as for indicating meteorological changes. For the construction of these instruments, we have employed Mr. James Green, formerly of Baltimore, now of New York; and in order that the instruments furnished by him to ourselves, or sold to our observers, may be comparable with each other, we have procured a standard barometer from London, with which each instrument, previously numbered, is accurately compared, and the record carefully preserved. We have also decided upon the forms of rain and snow gauges and wind vanes, and have ordered a number of these to be constructed by Benjamin Pike & Son, Broadway, New York.

It is the policy of the Institution to do as much with its funds as possible, and to call in aid from every quarter whence it may be obtained. With reference to the system of meteorology, I am happy to inform the Board that we have received assistance from a number of sources from which it could scarcely have been expected at the commencement of the scheme. The last Congress appropriated two thousand dollars for meteorology, to be expended under the direction of the Navy Department. It was understood that Professor Espy was to be engaged in the investigations to be made in accordance with this appropriation, and, in order that his labors might co-operate with those of the Institution, the late Secretary of the Navy directed him to apply to me for instructions. During the past year he has been engaged in directing observations and making preparation for a series of experiments having an important bearing on the explanation of meteorological phenomena. It is understood that the remainder of this appropriation, after paying the salary of Mr. Espy, will be expended in defraying incidental expenses, such as printing, engraving, &c.

The Regents of the University of the State of New York, in 1825, organized a system of meteorology, which has continued ever since, and which has added many interesting facts to the stock of scientific knowledge. In order to extend the usefulness of this system, the Regents of the University have lately resolved to reorganize the whole and to supply the observers with accurate and well compared instruments. This work has been intrusted to Dr. T. Romeyn Beck and one of our Regents, Gideon Hawley, esq., both of Albany. They have adopted the same system and instruments as those of the Smithsonian Institution,

and have agreed to co-operate fully with us in the observation of the general and particular phenomena of meteorology. A similar movement has been made in the legislature of Massachusetts for the establishment of a system of observations; and it is hoped that the other States of the Union will follow these examples. We are also happy to state that the medical department of the army, under the direction of Surgeon General Lawson, has signified its willingness to unite with us in the same system, and to furnish the new military posts with instruments constructed on the same plan, and compared with the Smithsonian standard. We hope, therefore, within the coming year, that there will be established at least fifty stations in different parts of North America, furnished with accurate instruments of this kind.

During the past summer I visited Canada, principally for the purpose of examining the meteorological instruments and the method of using them employed at the Observatory of Toronto. Captain Lefroy, the director of this institution, offered me every facility for acquiring the desired information. He also furnished me with a list of military posts in Canada at which observations may be made, and gave assurance of the hearty co-operation in our labors of the officers attached to these posts. We have also a prospect of procuring permanent observations from Bermuda, some of the West India islands, and from Central America.

From all these statements, it will be seen we are in a fair way of establishing a general system of meteorology, extending over a great portion of North America, including many stations furnished with compared instruments referred to the same standard. When fully organized, it will constitute one of the most important systems ever instituted; but to bring it fully into operation will require a judicious expenditure of all the funds at our disposal for this purpose. At the last session of the Board one thousand dollars were appropriated for meteorological purposes, the greater portion of which has been expended for instruments, among which are those to serve as standards; an equal sum at least will be required for the next year.

In connexion with the regular meteorological system, successful applications have been made to the presidents of a number of telegraph lines to allow us, at a certain period of the day, the use of their wires for the transmission of meteorological intelligence. We propose to furnish the most important offices along the lines with sets of instruments, and to give the operators special instructions for the observation of particular phenomena. It is hoped by this means to obtain results not otherwise accessible. Instruments for this purpose are now in process of construction, and as soon as they are completed the transmission of observations will commence.

The establishment of the extended system of meteorology which we have just described is a work of time and labor, the correspondence alone being sufficient constantly to occupy the time of one person; and the adjustment of the several parts of the plan has required more time than my other engagements would permit me to devote to it.

Magnetic Observations.

A set of magnetic apparatus was ordered from London for the purpose of determining the lines of magnetic intensity, declination, and inclination. These are entrusted to Colonel Emory, of the Boundary Commission, and in his possession they will probably be made to do good service in the cause of science. As soon as the funds will admit of the appropriation, it would be advisable to purchase several sets of instruments of the same kind, to be placed in the hands of the scientific explorers of our new territories, and for determining the principal magnetic lines across the United States.

Physical Geography.

Another subject of much interest, connected with the physical geography of our country, is the collection of the statistics of all railway and canal explorations which have been made in various parts of the United States and Canada. This information, at present in the possession of individuals, is of little value, and, unless collected by some public institution, will soon be lost to the world. Surveys of this kind furnish the most exact data for the determination of what may be called the mountain bases or general water-sheds of the surface; and no portion of the world, of the same extent, has been so thoroughly traversed with these explorations as the United States. Connected with these, sketches should be made of the principal mountain ranges, barometrical measurements of the higher peaks, with geological sections of the strata through which the public works are carried. For the purpose of commencing this collection, we have addressed letters to all persons within our knowledge who possess information of this kind, requesting memoirs from them containing results of their own measurements and observations. By this means we hope to present a series of papers of the same character as that of Mr. Ellet, and thus furnish materials for a more accurate physical map of North America, as well as the means, in connexion with our operations in meteorology, for a more exact study of our climate.

During the past year Professor Guyot has made a barometrical exploration of the mountain system of New Hampshire, and he purposes to devote a portion of each year to investigations of this kind.

Natural History.

Our new possessions in Oregon, California, and Mexico offer interesting fields for scientific inquiry, particularly in the line of natural history; and Dr. Gray, of Cambridge, and Dr. Engleman, of St. Louis, aided by several scientific gentlemen interested in this branch of science, have sent a number of collectors to develop the resources of those regions, particularly so far as the botany is concerned.

Among these, Mr. Charles Wright has been engaged to make explorations during the past year in New Mexico, at the expense of a subscription by individuals and institutions. He has just returned laden with a valuable collection of plants, seeds, &c., which are to be di-

vided among those who defrayed the expense. In behalf of the Smithsonian Institution $150 was subscribed towards this enterprise, and for this we are entitled to a full set of all the objects collected. These are to be submitted to Dr. Gray, of Cambridge, to be described in a memoir by him, and to be published in the Smithsonian Contributions. Mr. Wright is expected to start on another expedition early in the spring, for the purpose of making explorations in natural history in the regions around El Paso; and it will be well for the Smithsonian Institution to further assist this laudable enterprise with another subscription of an equal amount.

We have also purchased, for the sum of $20, a set of the plants collected by Mr. Fendler, in the vicinity of Santa Fe, during the year 1847. This adventurous explorer, under the direction of the gentleman previously mentioned, is now engaged in investigating the botany of the great valley of the Salt Lake, and it is proposed further to assist him by the purchase of a set of the collections he may obtain. By cooperating in this way with individuals and institutions we are enabled, at a small expense, materially to advance the cause of science.

Ancient Monuments.

Another object, the prosecution of which falls particularly within the province of the Institution, is that of obtaining descriptions of the ancient monuments of North America. Circulars have been sent to gentlemen in various parts of the country, requesting them to furnish surveys and explorations of mounds and other ancient works which are reputed to exist in their vicinity. To facilitate these investigations, we have requested the authors of the first volume to draw up, from the results of their experience, a set of instructions for the proper examination and description of works of this kind. The same subject has also been placed before several historical societies, established in places where mounds are known to exist. In connexion with this subject, we cannot too highly commend the policy of the new Territory of Minnesota, which, among the first of its acts, has established a Historical Society, to gather up the record of events as they occur, and thus to preserve the unappreciated facts of the present—destined to become history in the future. An important and interesting part of the labors of such societies would be the survey and exploration of the ancient monuments which might be found in their vicinity. Brief accounts of these might be published in the proceedings of the societies, while detailed descriptions and drawings could be given to the world at the expense and through the transactions of the Smithsonian Institution.

The publication of our first volume has awakened a lively interest in this subject, and we have received accounts of various locations of mounds and other ancient works in different parts of the country which were previously unknown. A gentleman, well qualified for the task, is now engaged in preparing for us an ethnological chart indicating the relative positions, as far as they are known, of all the monuments of this kind. This chart may be improved from time to time, and will be the means of eliciting important additional information. Indeed, this

whole subject should be prosecuted by the Institution, until all accessible information has been collected. The Smithsonian Institution owes this to the world. The work should be done quickly; for the plough, as well as the elements, are every year rendering less visible the outlines and distinctive forms of these remnants of the arts and policy of the ancient inhabitants of this continent.

Bibliographia Americana.

In the last report an account is given of the preparation of a work on the bibliography of America, by Henry Stevens, of Vermont. This work, it will be recollected, is to contain a brief account of every book published in, or relating to, North America, prior to 1700, with references to the different libraries in this and other countries in which these works are to be found. The Institution agreed to publish this work at its own expense, provided, on examination by a commission of competent judges, it is found properly executed. Mr. Stevens is now engaged in the British Museum cataloguing all the works embraced in this plan, and informs me that he is making good progress in his enterprise.

Reports on the Progress of Knowledge.

Of the reports on the progress of knowledge, proposed in the plan of organization, none have as yet been published, though several of those mentioned in my report of last year have been completed, or are very nearly ready for the press. The appropriations, however, for the last year were not found sufficient for carrying out further this part of the plan.

The most important report now in progress is that on the forest-trees of North America, by Dr. Gray, Professor of Botany in Harvard University. It is intended in this work to give figures from original drawings of the flowers, leaves, fruit, &c., of each principal species in the United States proper, for the most part of the size of nature, and so executed as to furnish colored or uncolored copies—the first being intended to give an adequate idea of the species, and the second for greater cheapness and more general diffusion.

This work will be completed in three parts, in octavo, with an atlas of quarto plates—the first part to be published next spring. A portion of this will be occupied with an introductory dissertation giving the present state of our knowledge, divested as much as possible of all unnecessary technical terms—of the anatomy, morphology, and physiology of the tree—tracing its growth from the embryo to its full development and reproduction in the formation of fruit and seed. This will be illustrated by drawings from original dissections under the microscope, and sketches made, in every instance, from nature. As the work will be adapted to general comprehension, it will be of interest to the popular as well as the scientific reader.

Report on the history of the discovery of the planet Neptune.—The first part of a report on recent discoveries in astronomy has been completed, and is ready for the press. This is written by Dr. B. A. Gould, of

Cambridge, editor of the American Astronomical Journal. Copious references to authorities are given in foot-notes, which will render the work interesting to the professed astronomer as well as to the less advanced student.

A report has been prepared by Professor Guyot, late of the University of Neufchatel, on the construction and use of meteorological instruments, more particularly designed for distribution among our meteorological observers. This gentleman is now engaged, at the expense of the Regents of the University of the State of New York, in establishing a new system of meteorology, and in instructing the observers in the use of the instruments; for which service he is well adapted by his experience in a similar undertaking in Switzerland.

The report on the application of chemistry to agriculture is also nearly ready for the press. This is by Dr. Lewis C. Beck, of Rutgers College, New Jersey.

Collections.

Apparatus.—The plan of organization also contemplates the formation of a museum of physical instruments, which may be used for experimental illustration and original research, and may serve as models to workmen as well as to illustrate the general progress of inventions in this line.

The munificent donation of Dr. Hare has enabled us to commence this collection with very flattering prospects. It now contains, besides the articles of Dr. Hare, instruments for the illustration of the principles of light, heat, and sound, procured from Paris, and a full set of pneumatic instruments, of superior size and workmanship, constructed expressly for the Institution by Mr. Chamberlain, of Boston; also, a number of chemical articles purchased during the last year; a set of magnetical instruments, already noticed; a standard barometer and thermometers, and other meteorological instruments, procured from Europe. It is proper that I mention, in this place, that we are indebted to Professor Snell, of Amherst, for superintending the construction of a set of very ingenious instruments devised by himself for the illustration of wave motion. It is believed that the collection of instruments of research will, in due time, not only form a feature of great interest, but that it will surpass in extent similar collections in other countries.

It is intended to publish a descriptive catalogue of all the instruments for the use of visitors; and it may be advisable to illustrate this by wood-cuts, particularly as we have had presented to us all the wood engravings employed by Dr. Hare in describing his apparatus.

It is not in accordance with the plan of organization to confine the instruments of observation to the immediate use of the officers of the institution, but to suffer them to be employed, under certain restrictions, by others who are possessed of the requisite degree of skill. This practice may be attended in some cases with loss, and the breakage of instruments; but the expenditure which may be incurred on this account will probably be more than compensated by the advance to knowledge resulting from the adoption of the plan.

A small appropriation has been made for collections in natural history during the past year; and, under the direction of a distinguished young naturalist, upwards of ten thousand specimens of vertebrated animals, principally reptiles and fishes, have been obtained. Many of these are rare specimens from unexplored parts of our country, and a considerable number of them consists of undescribed species. They furnish the materials for an interesting series of memoirs on physiology, embryology, and comparative anatomy. The whole cost of making this collection did not exceed $140. We are convinced, from the important results obtained by this small expenditure, that a most valuable working collection of objects of the natural history of North America can be obtained at a very moderate outlay of funds.

Library.

During the past year the process of developing the plan of the library, as given in the programme, has been carried out by Professor Jewett as far as the funds which could be devoted to the purpose would allow.

Considerable progress has been made in the plan of forming a general catalogue of all the important libraries in the United States; and Professor Jewett has wisely commenced the preparation of a catalogue of all the books to be found in the different libraries in the city of Washington, including those of the several departments of the government; and in this way he will be enabled to exhibit the importance of catalogues of this kind.

He has also devoted much time to the continuation of his researches relative to the statistics of libraries in this country, and for an account in detail of his valuable labors in this line I must refer to his report herewith transmitted. I will also direct attention to some important suggestions in his report on the subject of the deposit of books for securing copyright, and the establishment of a bulletin.

Museum.

The formation of a museum of objects of nature and of art requires much caution. With a given income to be appropriated to the purpose, a time must come when the cost of keeping the objects will just equal the amount of the appropriation; after this no further increase can take place. Also, the tendency of an Institution of this kind, unless guarded against, will be to expend its funds on a heterogeneous collection of objects of mere curiosity; whereas the plan presented in the programme contemplates complete definite collections arranged for scientific purposes, rather than for popular display.

In this connexion there is one point which I beg to present to the consideration of the Board as one of much importance, and which, if possible, should be decided at this meeting, because on it will depend the arrangement of that part of the building devoted to natural history. I allude to the acceptance of the museum of the Exploring Expedition.

By the law incorporating this Institution, "all objects of art and of foreign and curious research, and all objects of natural history, plants, and geological and mineralogical specimens belonging to or hereafter to belong to the United States, which may be in the city of Washington, in whosesoever custody the same may be, shall be delivered to such persons as may be authorized by the Board of Regents to receive them."

This law evidently gives to the Smithsonian Institution the museum in the Patent Office, the conservatory of plants, and all specimens of nature and art to be found in the several offices and departments of the government. The act, however, cannot be construed as rendering it obligatory on the Regents to take charge of these articles, if, in their opinion, it is not for the best interests of the Institution that they should do so. Though one of the reasons urged upon the Regents for the immediate erection of so large a building was the necessity of providing accommodation for this museum, I have been, from the first, of the opinion that it is inexpedient to accept it.

This museum was collected at the expense of the government, and should be preserved as a memento of the science and energy of our navy, and as a means of illustrating and verifying the magnificent volumes which comprise the history of that expedition. If the Regents accept this museum, it must be merged in the Smithsonian collections. It could not be the intention of Congress that an Institution founded by the liberality of a foreigner, and to which he has affixed his own name, should be charged with the keeping of a separate museum, the property of the United States. Besides this, the extensive museum of the Patent Office would immediately fill the space allotted for collections of this kind in the Smithsonian edifice, and in a short time another appropriation would be required for the erection of another building. Moreover, all the objects of interest of this collection have been described and figured in the volumes of the expedition, and the small portion of our funds which can be devoted to a museum may be better employed in collecting new objects, such as have not yet been studied, than in preserving those from which the harvest of discovery has already been fully gathered.

The answer made to some of these objections has usually been, that the government would grant an annual appropriation for the support of the museum of the Exploring Expedition. But this would be equally objectionable; since it would annually bring the Institution before Congress as a supplicant for government patronage, and ultimately subject it to political influence and control.

After an experience of three years, I am fully convinced that the true policy of the Institution is to ask nothing from Congress except the safe-keeping of its funds, to mingle its operations as little as possible with those of the general government, and to adhere in all cases to its own distinct organization, while it co-operates with other institutions in the way of promoting knowledge; and on the other hand, that it is desirable that Congress should place as few restrictions on the Institution as possible, consistent with a judicious expenditure of the income, and that this be judged of by a proper estimate of the results produced.

Lectures.

At the last meeting of the Board an appropriation of five hundred dollars was made to defray the expense of lectures to be given before the Smithsonian Institution, a part of which only is expended. The first course, in accordance with this part of the plan of organization, was by Professor Koeppen, of Denmark, on Modern Athens. These lectures were illustrated by a number of large drawings, for the use of which the Institution is indebted to the Lowell Institute of Boston. A second course was delivered by Dr. Hitchcock, President of Amherst College, on geology, in the lecture-room of the east wing of the Smithsonian building; and both courses were attended by large and apparently interested audiences. The results of these lectures indicate that much good may be effected in Washington by this means of communicating knowledge. No city, perhaps, of the same number of inhabitants, contains so many intelligent and well educated persons desirous of obtaining information; and no point in our country is so favorably situated for the dissemination of opinions, by means of lectures, as the political centre of the American Union. Invitations have been given to a number of distinguished gentlemen in different parts of the United States to favor us with courses of lectures during the present session of Congress, and in almost every case the invitation has been accepted. It is intended to extend these invitations so as to call here in succession all who have distinguished themselves in literature or science. We shall not seek mere popular lecturers, whose chief recommendation is fluency of speech, or powers of rhetorical declamation, but chiefly those who are entitled, from their standing and acquirements, to speak with authority on the subjects of their discourse, and whose character will tend to give due importance to their communications. It is to be regretted that the amount of funds which can be devoted to this object is not as great as could be wished. It is hoped, however, that many persons will consider the opportunity of visiting Washington, and the compliment paid by the invitation, as in part a remuneration for the labor and time which their lectures may cost. But in all cases, sufficient should be allowed to defray all necessary expenses, and, as soon as the state of the funds will permit, to reward liberally, rather than otherwise, those who are called to assist the Institution in this way. I forbear to publish the names of those who have consented to lecture, lest they should be accidentally prevented from filling their engagement, and the public thus be disappointed.

To facilitate the approach to the building, at the time of these lectures, the walks were temporarily improved, at a considerable expense to the Institution. It is hoped that the authorities of the city of Washington will cause bridges to be erected across the canal, and walks to be constructed through the public grounds, to facilitate the approach to the building, and that the Institution will not be expected to provide accommodations of this kind.

Building.

The east wing of the building was taken possession of by the Secretary in April last, and has since been constantly occupied. The west wing is now finished, and it is contemplated to occupy it temporarily as a library until the portion of the main building intended for this purpose is completed.

The plan of the Smithsonian building was designed by the architect, and recommended to the Board by a committee of the Regents, before the programme of organization was adopted. It is not strange, therefore, when the building came to be occupied, that changes in the internal arrangement should be deemed advisable which would better adapt it to the wants of the Institution. Such changes, at my suggestion, have been made; and for the propriety of these I am responsible. They are principally, however, those of simplification, and in themselves add nothing to the cost of the edifice. An increased expense, however, will arise out of the furnishing of new rooms, which have been acquired by the alterations.

All of which is respectfully submitted.

JOSEPH HENRY,
Secretary of the Smithsonian Institution.

FOURTH ANNUAL REPORT

Of the Secretary of the Smithsonian Institution, for the year 1850.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: During the past year the several parts of the plan of organization have been prosecuted as efficiently as the portion of the income which could be devoted to them would permit. The financial affairs are in a prosperous condition, and though the funds are burthened with the erection of a costly building, and the expenditures trammelled by restrictions growing out of the requisitions of the charter of incorporation, yet the results thus far obtained are such as satisfactorily to prove that the Institution is doing good service in the way of promoting and diffusing knowledge.

Though the programme of organization has been given in two of the annual reports and extensively published in the newspapers, its character does not appear to be as widely known and as properly appreciated as could be desired. Indeed it will be necessary at intervals to republish the terms of the bequest, and also the general principles of the plan which has been adopted, in order that the public may not only be informed of what the Institution is accomplishing, but also reminded of what ought reasonably to be expected from its operations. Moreover, there is a tendency in the management of public institutions to lose sight of the object for which they were established, and hence it becomes important frequently to advert to the principles by which they ought to be governed. I beg leave, therefore, as introductory to this report, briefly to recapitulate some of the propositions of the programme of organization, and to state some of the facts connected with its adoption.

SMITHSON left his property, in case of the death of his nephew, to whom it was first bequeathed, "to found at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men." These are the only words of the testator to serve as a guide to the adoption of a plan for the execution of his benevolent design. They are found, however, when attentively considered, to admit of legitimate deductions sufficiently definite and comprehensive.

1. The bequest is made to the United States, in trust for the good of *mankind.*

2. The objects of the Institution are two-fold: first, to increase; second, to diffuse knowledge; objects which, though often confounded with each other, are logically distinct and ought to be separately regarded. The first is the enlargement of the existing stock of knowledge by the discovery of new truths, and the second is the dissemination of these and other truths among men.

3. No particular kind of knowledge is designated; hence a liberal interpretation of the bequest will include no part of the great domain of

science and literature from the degree of attention its importance may demand.

4. Since mankind are to be benefited by the bequest, any unnecessary expenditure on merely local objects would not be in accordance with the proper administration of the trust.

5. Though the funds are generally considered large, and much is expected of them, they are really small in proportion to the demands made upon them. The annual income of the bequest is less than half the cost of the publication of a single yearly report of the Patent Office.

6. In order, therefore, that the limited income may effect the greatest amount of good, it should be expended in doing that which cannot be done as well by other means.

These views, which have commanded the assent of all unprejudiced and reflecting persons who have studied the subject, have been the guiding principles in all cases in which I have had any power of direction; and I am happy to say they are fully adopted by the present directors and officers of the Institution.

To carry out the design of the testator, various plans were proposed; but most of these were founded on an imperfect apprehension of the terms of the Will. The great majority of them contemplated merely the diffusion of popular information, and neglected the first and the most prominent requisition of the bequest, namely, the "increase of knowledge." The only plan in strict conformity with the terms of the Will, and which especially commended itself to men of science, a class to which Smithson himself belonged, was that of an active living organization, intended principally to promote the discovery and diffusion of new truths by instituting original researches, under the direction of suitable persons, in History, Antiquities, Ethnology, and the various branches of Physical Science, and by publishing and distributing among libraries and other public institutions, accounts of the results which might thus be obtained, as well as of those of the labors of men of talent which could not otherwise be given to the world.

This plan, which was probably in the mind of the donor when he gave expression to the few but comprehensive words which indicate the objects of the bequest, is found from our experience to be eminently practical. It requires no costly building or expensive permanent establishment. Its operations, limited only by the amount of the income, are such as to affect the condition of man wherever literature and science are cultivated, while it tends in this country to give an impulse to original thought, which, amidst the strife of politics, and the inordinate pursuit of wealth, is of all things most desirable.

It was with the hope of being able to assist in the practical development of this plan, that I was induced to accept the appointment of principal executive officer of the Institution. Many unforeseen obstacles, however, presented themselves to its full adoption; and its advocates soon found, in contending with opposing views and adverse interests, a wide difference between what, in their opinion, ought to be done and what they could actually accomplish.

The plan was novel, and by many considered entirely chimerical; indeed it could not be properly appreciated except by those who had been devoted o original research. Besides this, the law of Congress

incorporating the Institution, while it did not forbid the expenditure of a part of the income for other objects, authorized the formation of a Library, a Museum and a Gallery of Art, and the erection of a building, on a liberal scale, for their accommodation. It was, indeed, the opinion of many that the whole income ought to be expended on these objects. The Regents did not consider themselves at liberty to disregard the indications of Congress, and the opinion expressed in favor of collections; and after much discussion it was finally concluded to divide the income into two equal parts, and, after deducting the general expenses, to devote one half to the active operations set forth in the plan just described; and the other, to the formation of a Library, a Museum and a Gallery of Art.

It was evident, however, that the small income of the original bequest, though in itself sufficient to do much good in the way of active operation, was inadequate to carry out this more extended plan—to maintain the staff of attendants, and to defray other contingent expenses incidental to a large establishment of this kind. Besides the Secretary and an assistant to attend to the general operations, two principal assistants would be required, one to take charge of the Library and the other of the Museum of Natural History; and to these sufficient salaries must be given, to secure the services of men of the first reputation and talents in their respective lines. It, therefore, became absolutely necessary that the income should be increased; and in order to do this, it was proposed to save the greater part of the $242,000 of accrued interest which Congress had authorized to be expended in a building, by erecting, at a cost not to exceed $50,000, the nucleus of an edifice, which could be expanded as the wants of the Institution might require, and to add the remainder to the principal.

Unfortunately, however, for this proposition, Congress had presented to the Institution the great museum of the Exploring Expedition; and a majority of the Regents, supposing it necessary to make immediate provision for the accommodation of this gift, had taken preliminary steps, previous to my appointment, to construct a large building, and indeed a majority of the committee, to which the matter was referred, had determined to adopt the plan of the present edifice. Strenuous opposition was, however, made to this; and as a compromise, it was finally agreed to draw from the United States treasury $250,000 of accrued interest, and instead of expending this immediately in completing the plan of the proposed building, to invest it in treasury notes, then at par, and to finish the building in the course of five years, in part out of the interest of these notes, in part out of the sale of a portion of them, and also in part out of a portion of the annual interest accruing on the original bequest. It was estimated that in this way, at the end of five years, besides devoting $250,000 to the building, the annual income of the Institution would be increased from $30,000 to nearly $40,000, a sum sufficient to carry out all the provisions of the programme.

After the resolutions relative to the division of the income, between collections on the one hand and active operations on the other, had been adopted, and the plan of finance as to the building had been settled, I was requested to confer with persons of literary and scientific reputa-

tion, and to digest into the form of a general programme the several resolutions of the Board. In the programme which was thus produced and afterwards adopted, it is attempted to harmonize the different propositions of the Board, and to render them all, library, collections, &c., as far as possible, subservient to a living, active organization. Though a valuable library will in time be accumulated, by donation and the exchange of the publications of the Institution, the design at first is to purchase only such books as are immediately necessary in the other operations of the Institution, or which cannot be procured in this country; and the Librarian is required to perform other duties than those which pertain to the office of an ordinary collector and curator of books. He is directed to report on plans of libraries, and the best method of managing them; to collect the statistics of the libraries of the United States; to make a general catalogue as far as possible of all the books in this country, and to procure all the information necessary for rendering the Institution a centre of bibliographical knowledge. Instead of attempting to form a miscellaneous collection of objects of nature and art, it is proposed to collect only those which will yield a harvest of new results, and to preserve principally such as are not found in other collections, or will serve to illustrate and verify the Smithsonian publications.

The tendency of an Institution in which collections form a prominent object, is constantly towards a stationary condition; with a given income, the time must inevitably come when the expenditures necessary to accommodate the articles with house room and attendance will just equal the receipts. There is indeed no plan by which the funds of an institution may be more inefficiently expended, than that of filling a costly building with an indiscriminate collection of objects of curiosity, and giving these in charge to a set of inactive curators. Happily, the programme of organization and the system of expenditure which the Regents have adopted, if rigidly adhered to, will prevent this state of things, and happily the spirit of the present directors and officers who are to give the initial form to the character of the Institution, is in accordance with as active operations as the state of the funds and requisitions of Congress will allow.

It is to be regretted that Congress did not leave the entire choice of the plan of organization to those who were to be entrusted with the management of the bequest, and that, instead of the plan of a costly building, there had not been adopted the nucleus of a more simple edifice, which could have been modified to meet the wants which experience might indicate.

The original estimate for the building, furniture, and improvement of the grounds, was $250,000; and could the actual cost have been confined to this sum, all the results anticipated from the scheme of finance which had been adopted would have been realized at the end of five years. During the past year, however, it has been found necessary, for the better protection of the collections, to order the fire-proofing of the interior of the edifice, at an increased expense of $44,000. This additional draft on the funds can only be met by extending the time for the completion of the building; and even this will require the appropriation of a portion of the income which ought to be devoted to other

purposes. The active operations will suffer most by this draft on the income, since it will be made for the better accommodation of the library and the museum.

It must not be inferred, from the foregoing account, that the affairs of the Institution are in an unfavorable condition; on the contrary, though they are not in every respect what could be wished, still, under the circumstances I have mentioned, they are much better than could have been anticipated. The funds are in a very prosperous state, and all the obstacles in the way of the usefulness of the establishment may, by judicious management, in time be removed. The opposition which was made to the building, led to the adoption of the plan of finance to which I have heretofore adverted, and from this has been realized much more than could have been expected.

After all the expenditures which have been made on the building, grounds, publications, researches, purchase of books and apparatus, not only is the original bequest untouched, but there is now on hand upwards of $200,000 of accrued interest. This will be sufficient to finish the exterior of the building, including all the towers, the interior of the wings, ranges, and a part of the interior of the main edifice; which will afford sufficient accommodation for some years to come, and leave $150,000 to be added to the principal.

This result has been produced by a rigid adherence to the determination of increasing the annual income; and in accordance with this, and in obedience to the direction of the Board of Regents, a petition has been presented to Congress, asking that $150,000 may be taken from the Institution and placed in the treasury of the United States, on the same terms as those of the acceptance of the original bequest, never to be expended, and yielding a perpetual interest of six per cent.

If this petition be granted, all the funds will be permanently and safely invested, and the original income will be increased from $30,000 to nearly $40,000. Out of this, besides carrying on the more important object of the plan, it is proposed to appropriate yearly a small sum for the gradual completion of the interior of the building.

The great importance of a small addition to the income will be evident, when it is recollected that a definite sum is annually required to defray the necessary expenses of the establishment, and that after this has been provided every addition will tend to produce a greater proportional amount of useful effect. The proposed increase will be sufficient to pay all the salaries of the officers, and leave the original income in a great measure free to be applied to the objects contemplated in the plan.

At the last meeting of the Board, Professor Baird, of Dickinson College, Pennsylvania, a gentleman distinguished for his attainments in science, was appointed an Assistant Secretary in the department of natural history. His appointment was made at this time more particularly in order that his services might be secured to take charge of the publications, and that we might avail ourselves of the ample experience which he had gained in this line. He entered on his duties in July last, and besides being actively engaged in organizing the department of natural history, he has rendered important service in conducting our foreign exchanges and attending to the business of the press.

This addition to our force was absolutely necessary to a more efficient discharge of the duties which devolve on us. No person, except from actual experience, can form an idea of the amount of labor required for the transaction of the ordinary business. The correspondence alone is sufficient to occupy two persons continually during the usual office hours.

During the past year one-half of the whole income has been appropriated to the building; and after deducting the general expenses, the remainder has been equally divided between the two great classes of objects designated in the plan. The portion of the income after these divisions, which could be devoted to any one object, has been necessarily small; for example, all that could be expended for researches, publications, and lectures, and indeed for every thing of which the public at a distance could take immediate cognizance, has not exceeded $4,500, and yet out of this sum we have been expected to produce results for which the whole income would be entirely inadequate. I trust, however, that a proper consideration of the facts presented in the remainder of this report, will show that much has been done in proportion to the means at our command.

Publication of Original Memoirs.

The important aid which can be rendered to the promotion of knowledge by the publication, and in some cases by assistance in the preparation of important memoirs, is now beyond all question. Experience has thus far abundantly shown that much more matter of the most valuable character will be presented for publication, free of all charge, than the portion of the income devoted to this object will allow us to publish. Indeed, there is now on hand, or in preparation, more material of this kind than we shall be able, with our limited income, to give to the world in two or three years. In view of this fact, I cannot repress the expression of regret which I have always felt, that the restrictions arising from the requisitions of Congress do not permit a greater expenditure for this most important object. It is chiefly by the publications of the Institution that its fame is to be spread through the world, and the monument most befitting the name of Smithson erected to his memory.

Most of the distinguished foreign literary and scientific societies have placed the Institution on their list of exchange, and in many instances have presented not only the current volume of their Transactions, but also full sets of the preceding volumes. We have reason to believe that before the expiration of another year, we shall receive in exchange the Transactions of nearly all the learned societies of the world, and that the Institution will be recognised by them as an active co-operator in the promotion of knowledge. Professor Baird has furnished a list of the literary and scientific societies to which the quarto volumes have been presented.

The following Memoirs, an account of which was given in my last report, have been printed, or are now in press:

1. Researches relative to the planet Neptune; by S. C. Walker.

2. Contributions to the Physical Geography of the United States; by Charles Ellet, jr.

3. Memoir on the Explosiveness of Nitre; by Dr. Robert Hare.

4. On the Aboriginal Monuments of the State of New York; by E. G. Squier.

5. Memoir on the Reciprocal Action of two Galvanic Currents; by A. Secchi, of Georgetown College.

6. On the Classification of Insects, from Embryological Data; by Professor Louis Agassiz.

7. Monograph of Mosasaurus and the allied Genera; by Dr. R. W. Gibbes.

Besides these, several other papers not described in my last report have been printed, and are ready for separate distribution. The first of these I shall mention is by Professor Lieber, of the College of South Carolina, on the vocal sounds of Laura Bridgman, the blind and deaf mute, whose mind, apparently forever consigned to darkness, has been almost miraculously enlightened, by the sagacity, ingenuity, and perseverance of Dr. Howe.

There is, perhaps, at this time, no living human being who offers to the psychologist so attractive an object of study as this individual; and hence every observation relative to her peculiar habits is of great interest. Dr. Lieber has, from year to year, during his summer vacations, been in the habit of visiting Laura Bridgman, and on one occasion spent three months in her immediate neighborhood for the purpose of studying the sounds which she utters as indicative of ideas. These sounds consist principally of such as she voluntarily adopted to designate different individuals. The results of the observations given in this paper are accompanied by a series of philosophical deductions and suggestions which cannot fail to interest the psychologist and physiologist. This memoir is illustrated by an engraved *fac simile* of a letter from Laura Bridgman's own hand.

The next paper is by Professor Bailey of West Point. This gentleman has rendered himself favorably known to the world of science by his researches on minute animals and plants, which, though mostly unseen by the naked eye, are found as widely distributed, and as permanent and definite in character, as the largest organized objects in nature. This paper gives the results of a series of microscopic observations which the author made during his sojourn in the southern part of the United States, whither he was ordered last winter on account of his health. It designates numerous localities of microscopic animals and plants, and furnishes lists of the species found in each. It also contains a series of tables presenting a number of species with the different localities where each was found. The species so classed include those of the Desmidiæ, Diatomaceæ, Infusoriæ, and Algæ. Following these is a description of numerous other species, most of which are represented by lithographic figures.

Among the interesting facts arrived at by the author, are the discovery of an extensive stratum of fossil infusoriæ near Tampa Bay, Florida; the existence of infusoriæ in the rice fields of the south; and the demonstration of the cosmopolite character of many microscopic objects hitherto believed to exist only in Europe.

Another paper by the same author, but presented to the Institution by Professor Bache, Superintendent of the U. S. Coast Survey, has refer-

ence to a microscopic examination of soundings along the eastern coast of the United States; samples of all the materials brought up by the sounding apparatus of the Coast Survey having been carefully preserved by Professor Bache in bottles, and so arranged as to present, as it were, the surface geology of the bottom of the sea within a certain distance from the shore. Specimens of these were given to Professor Bailey for microscopic examination, and the results are presented in this paper. It exhibits the fact of a high development of minute organic forms, mainly of Polythalamia, in all deep soundings, varying from fifty-one to ninety fathoms, occurring in an abundance similar to that in which analogous fossil forms are found in the marls under the city of Charleston. It also shows that each locality has its predominant species, by means of which alone the region whence they were taken may be indicated. Many of the conclusions derived are of much interest to the mariner, the geologist, and the naturalist. The paper closes with a brief description of the genera and species referred to, embracing several that are new, the whole accompanied by numerous figures.

In connexion with the foregoing may be mentioned a paper by Mr. Charles Girard, entitled "A Monograph of the Fresh Water Cottoids of North America," which has been accepted, and will soon be published. The species of fish called *Cottus gobio* was supposed to be common to Europe and America, and thus to form an exception to a general rule in regard to the fresh water species of the two continents. It has been discovered by Mr. Girard and others, that the European species, as described by Linnæus, is really composed of several, and that while none of these are found in North America, we have actually a number of species peculiar to this country. The memoir contains elaborate descriptions of the known species as well as of several new ones, together with copious notes on their scientific history, their geographical distribution, affinities with each other and with foreign species, anatomical structure, &c.; the whole illustrated by appropriate figures. It is worthy of remark, that most of the hitherto undescribed species presented in this memoir were collected by Professor Baird, and now form a part of the Smithsonian collection.

Another memoir, now in course of preparation, is one which will of itself occupy a considerable portion of one of the quarto volumes of the Smithsonian Contributions. It affords an interesting illustration of the working of the plan of organization in the way of eliciting important scientific knowledge which would not otherwise be produced, or, if produced, could not be given to the world through any other channel.

This memoir consists of a description of the marine plants, or Algæ, which are found along the eastern and southern coasts of the United States, and which are deserving of attention, not only on account of their beauty, variety, and the illustrations they present of the growth and development of vegetable forms, but also on account of their economical value with reference to agriculture and the chemical arts. This volume is in the course of preparation by Professor Harvey, of the University of Dublin, Ireland, a gentleman who is recognised as the first authority in this branch of botany. He was induced to visit this country by an invitation to lecture on the Algæ before the Lowell Institute, and by the opportunity thus offered him of studying his favorite

branch of science in a new region. After completing his lectures he made a collection of the marine plants of our coast, and offered to furnish drawings of the genera and species, with detailed descriptions free of all cost, provided the Institution would bear the expense of publication.

Upon the warm recommendation of some of the principal botanists of the country, the liberal offer of Professor Harvey was accepted, and he is now engaged in making, with his own hand, the drawings on stone. The preparation of the work, besides the time expended in collecting the specimens, will occupy two or three years. This voluntary contribution to knowledge from a man of science may surprise those whose minds are not liberalized by philosophical pursuits, and who cannot conceive any object in labor unconnected with pecuniary gain.

To assist in defraying the heavy expense of the publication of this work, it is proposed to color the plates of a part of the edition, and to offer copies for sale. The work will also be issued in parts, so as to distribute the cost through several years.

In addition to the foregoing, an appendix, added to Mr. Squier's paper on the ancient monuments of New York, has been printed. Also, there has been such an urgent demand for copies of Mr. Ellet's paper on the physical geography of the Mississippi Valley, that it has been thought advisable to reprint it, and distribute the whole of the first edition among all persons to whom a knowledge of its contents would be of peculiar importance.

The several papers which have been described in this and the preceding Report, will, when collected together, form the contents of the second and part of the third volume.

The plan adopted of printing each memoir with a separate title and paging has been found to answer a good purpose. There is no delay in printing one paper on account of the engraving of the plates of another; and long before a volume can be completed a separate memoir may be widely circulated among those most interested in its perusal. As an example of this I may mention that one of the papers which forms part of the second volume of the Contributions has already been reprinted in the London and Edinburg Journal, with due credit given to the Institution.

Reports on the Progress of Knowledge.

The income of the Institution as yet has not been sufficient for fully reducing to practice this part of the plan of organization. The preparation of these reports can only be entrusted to those who are familiar with the subjects, and well skilled in the art of composition, and the services of such persons cannot be obtained without an adequate remuneration. Of the several reports mentioned at the last meeting of the Board but one has been published, viz: that on the discovery of the planet Neptune, by Dr. B. A. Gould, of Cambridge, editor of the Astronomical Journal. It has been stereotyped, and copies distributed amongst all our meteorological observers, and other persons in the country known to us as being actively engaged in promoting the science of astronomy.

The preparation of the report on the Forest Trees of North America, though delayed in consequence of the absence of the author, Dr. Gray, of Harvard University, on a visit to Europe, is still in progress. The illustrations are in the hands of the artists, and the first part will probably be published during the present year. The cost of this report, on account of the elaborate illustrations, will be greater than was at first anticipated; consequently, the publication of the entire work must necessarily be spread over a number of years. It is believed, however, that a considerable part of the expense will be repaid to the Institution by the sale of copies at a small advance on the original cost.

The other reports on the Progress of Knowledge mentioned in my last communication to the Regents are ready for the press, and will be published, in whole or in part, during the present year.

The report on the statistics of Libraries of the United States, prepared by Professor Jewett, has been ordered to be printed by Congress, as an appendix to the Regents' Report. A sufficient number of extra copies will be presented to the Institution, for distribution to all the libraries from which statistical information was received. It forms a volume of about two hundred and twenty-five pages, and will, I am sure, be considered an important contribution to bibliographical statistics.

Distribution of Publications.

We have found considerable difficulty in deciding upon the rules to be observed in the distribution of the Smithsonian publications. It is evident that, from the small portion of the income which can be devoted to this object, the distribution must be circumscribed. Fifteen hundred copies of each memoir have been printed; but this number, though all that the income could furnish, has not been found sufficient to meet a tenth part of the demand. It should be recollected that, though these memoirs consist of the results of new investigations of the highest importance to the well-being of man in extending the bounds of his knowledge of the universe of mind and matter, yet they are not generally of such a character as to be immediately appreciated by the popular mind, and, indeed, they are better adapted to instruct the teacher than to interest the general reader. They should, therefore, be distributed in such a way as most readily to meet the eye of those who will make the best use of them in diffusing a knowledge of their contents.

The following rules have been adopted for the distribution of the quarto volumes of collections of memoirs:

1. They are to be presented to all Learned Societies which publish transactions, and give copies of these in exchange to the Institution.

2. To all Foreign Libraries of the first class, provided they give in exchange their catalogues, or other publications, or an equivalent from their duplicate volumes.

3. To all Colleges in actual operation in this country, provided they furnish in return meteorological observations, catalogues of their libraries and of their students, and all other publications issued by them relative to their organization and history.

4. To all States and Territories; provided they give in return, copies of all documents published under their authority.

5. To all incorporated Public Libraries in this country, not included in either of the foregoing classes, containing more than seven thousand volumes; and to smaller Libraries, where a whole State or large district would be otherwise left unsupplied.

The author of each memoir receives, as his only compensation, a certain number of copies, to distribute among his friends, or to present to individuals who may be occupied in the same line of research. In this way single memoirs are distributed to individuals, and especially to those who are most actively engaged in promoting discoveries. Copies of the reports, and also in some cases of particular memoirs, are sent to our meteorological observers. Besides these, we have placed on the list the more prominent Academies and Lyceums, as recipients of the minor publications. It is also intended, in order to benefit the public more generally, to place on sale copies of memoirs and reports; though on account of the number required for the supply of Institutions, we have not, as yet, been able to carry this plan into effect.

No copyright has been taken for the Smithsonian publications; they are therefore free to be used by the compilers of books, and in this way they are beginning to reach the general reader and to produce a beneficial effect on the public mind.

Meteorology.

The system of meteorology under the direction of the Smithsonian Institution has, during the last year, made good progress. And though the whole number of stations has not been much increased, yet the character of the instruments adopted, and consequently the value of the observations, has been improved both in precision and variety.

This system is intended to embrace, as far as possible, the whole extent of North America, and to consist of three classes of observers. One class, without instruments, to record the changes in the aspect of the sky, the direction of the wind, the beginning and ending of rain, the appearance of the aurora, &c. Another, in addition to the foregoing, to give an account of the changes of temperature, as indicated by the thermometer. A third class, furnished with full sets of instruments, to record all changes deemed important in the study of meteorology.

To carry on this system, the Institution has received or expects to receive assistance from the following sources:

1. From the small appropriation made by Congress, to be expended under the direction of the Navy Department.

2. From the appropriations made by different States of the Union.

3. From the observations made under the direction of the Medical Department of the United States army.

4. From the officers of her Majesty's service in different parts of the British possessions in North America.

5. From observations made by institutions and individuals, in different parts of the continent, who report immediately to the Smithsonian Institution.

A small appropriation has been made by Congress for two years pas

to be expended under the direction of the Navy Department for meteorological purposes; and Professor Espy, engaged under the act making this appropriation, has been directed to co-operate with the Institution, in promotion of the common object. Besides the aid which we have received from Professor Espy's knowledge of this subject, the general system has been benefited in the use of instruments purchased by the surplus of the appropriation, after paying the salary of the director and other expenses.

During the last year, Professor Espy has been engaged in a series of interesting experiments on the variations of temperature produced by a sudden change in the density of atmospheric air. The results obtained are important additions to science, and directly applicable to meteorology. The experiments were made in one of the rooms of the Smithsonian Institution, and with articles of apparatus belonging to the collection which constituted the liberal donation of Dr. Hare. An account of these investigations will be given in a report to the Secretary of the Navy.

It was mentioned in the last report that the Regents of the University of the State of New York, in 1849, made a liberal appropriation of funds for the reorganization of the meteorological system of observations established in 1825; and that Dr. T. Romeyn Beck and the Hon. Gideon Hawley, to whom the enterprise was entrusted, had adopted the forms and the instruments prepared under the direction of the Smithsonian Institution. Another appropriation has been made, for 1850; and the system has been carried, during the past year, into successful operation by Professor Guyot, late of Neufchatel, in Switzerland. This gentleman, who has established a wide reputation as a meteorological observer by his labors in his own country, was recommended to Dr. Beck and Mr. Hawley by this Institution, and employed by them to superintend the fitting up of the instruments in their places, to instruct the observers in the minute details of their duty, and to determine the topographical character and elevation above the sea of each station.

The whole number of stations which have been established in the State of New York is thirty-eight, including those which have been furnished with instruments by the Smithsonian Institution, and the Adirondack station by the liberality of Archibald McIntyre, esq., of Albany. This number gives one station to twelve hundred and seventy square miles, or about one in each square of thirty-five and a half miles on a side. These stations are at very different heights above the level of the sea. They were selected in conference with Dr. Beck, Professor Guyot, and myself. The State is naturally divided into the following topographical regions, namely:

1. The southern or maritime region.

2. The eastern, or region of the Highlands and Catskill mountains, with the valleys of the Hudson and Mohawk rivers.

3. The northern, or region of the Adirondack mountains, isolated by the deep valleys of the Mohawk, Lake Champlain, the St. Lawrence, and Lake Ontario.

4. The western, or region of the western plateau, with the small lakes and sources of the rivers.

5. The region of the great lakes, Erie and Ontario.

I regret to state that no efficient steps have as yet been taken to organize the system of Massachusetts, for which an appropriation was made by the legislature, at its last session. I have lately written to Governor Briggs, urging immediate action, and offering, on the part of the Institution, to render any assistance in our power towards furthering so laudable an enterprise. No answer has yet been received.*

The observations made at the different military stations, under the direction of the Medical Department of the United States army, have been partially reorganized, and a number of new stations and several of the old ones furnished with improved Smithsonian instruments. The head of the Medical Department of the army, Dr. Lawson, has assigned the general direction of the system of observations to Dr. Mower of New York, to whom we are indebted for the valuable aid which this extended set of observations furnishes the general system. The immediate superintendence of the reduction of these observations is in charge of Dr. Wotherspoon, to whose zeal and scientific abilities the cause of meteorology bids fair to be much indebted.

The most important service the Smithsonian Institution has rendered to meteorology during the past year, has been the general introduction into the country of a more accurate set of instruments at a reasonable price. The set consists of a barometer, thermometer, hygrometer, wind vane, and snow and rain gauge.

The barometer is made by James Green, No. 422 Broadway, New York, under the direction of the Institution. It has a glass cistern with an adjustable bottom enclosed in a brass cylinder. The barometer tube is also enclosed in a brass cylinder, which carries the vernier. The whole is suspended freely, from a ring at the top, so as to adjust itself to the vertical position. The bulb of the attached thermometer is enclosed in a brass envelope communicating with the interior of the brass tube, so as to be in the same condition with the mercury, and to indicate truly its temperature. Each instrument made according to this pattern is numbered and accurately compared with a standard. In the comparisons made by Professor Guyot, a standard Fortin barometer, by Ernst, of Paris, was employed; also, a standard English barometer, by Newman, of London, belonging to this Institution. These instruments, for greater certainty, have been compared with the standard of the Cambridge Observatory, and of Columbia College, both by Newman; also with the standard of the Observatory of Toronto, Upper Canada.

The results of these examinations prove the barometers made by Mr. Green, according to the plan adopted by the Smithsonian Institution, to be trustworthy instruments.

The thermometers are by the same maker; and those intended for the State of New York were compared with a standard by Bunten, of Paris, and with another by Troughton & Simms, of London. Those found to differ more than a given quantity from the standards were rejected.

* A letter has since been received, and the system placed under the direction of this Institution.

The instruments for indicating the variation of the hygrometrical condition of the atmosphere, consist of two thermometers, of the same dimensions, accurately graduated. The bulb of one of these is enveloped in a covering of muslin moistened with water, and that of the other is naked.

The rain and snow gauges, and also the wind vanes, are made under the direction of the Institution, by Messrs. Pike & Son, 166 Broadway, New York. The rain gauge is an inverted cone of sheet zinc, of which the area of the base is exactly one hundred square inches. This cone or funnel terminates in a tube which carries the water into a receiving vessel. The water which has fallen is measured by pouring it from the gauge into a cylinder, so graduated as to indicate hundredths of inches. A smaller cylinder is also provided, which gives thousandths of inches, and may serve, in case of accident, as a substitute for the large cylinder. The rain gauge is placed in a cask sunk in the earth, with its mouth near the level of the ground.

The snow gauge is a cylinder of zinc of the same diameter as the mouth of the rain gauge. The measurement is made by pressing its mouth downward to the bottom of the snow, where it has fallen on a level surface, then carefully inverting it, retaining the snow, by passing under it a thin plate of metal. The snow is afterwards melted, and the water produced is measured in one of the graduated glass cylinders of the rain gauge.

The wind vane is a thin sheet of metal, (it might be of wood,) about three feet long, carefully balanced by a ball of lead, and attached to the top of a long wooden rod, which descends along the wall of the building to the sill of the observer's window. It terminates in the centre of a fixed dial-plate, and its movements indicate the direction of the wind by a pointer attached to the rod.

The observer is by this arrangement enabled to determine the course of the wind, by looking down on the dial-plate, through the glass of the window, without exposing himself to the storm.

Besides the full sets of instruments furnished by the State of New York, from the appropriation of the regents of the University, the Smithsonian Institution has furnished a number of sets to important stations; and, in order that they might be more widely disseminated, we have directed Mr. Green to dispose of sets to individuals, at a reduced price, on condition that they will give us copies of the results of their observations; the remainder of the cost being paid by this Institution. A number of persons have availed themselves of this privilege.

To accompany the instruments, and for the use of those who take part in the Smithsonian system of meteorological observations, a series of minute directions, prepared by Professor Guyot, has been printed by the Institution. It occupies forty octavo pages, with wood-cut representations of the instruments, and is accompanied by two lithographic engravings, to illustrate the different forms of clouds, and to facilitate their notation in the journals, in accordance with the nomenclature adopted by meteorologists. A set of tables has also been furnished for correcting the barometrical observations, on account of variation of temperature. A set of hygrometrical tables, to be used with the wet

and dry bulb thermometers, and a set for the calculation of heights by the barometer, will be prepared.

We may also mention, in connexion with this subject, that a series of preliminary experiments have been made, in the laboratory of this Institution, for the purpose of constructing, from direct observation, a scale of boiling temperatures, corresponding to different degrees of rarefaction of the air. With a thermometer, each degree of which occupies one inch in length of the scale, the variations of the boiling point corresponding to a slight change in altitude are found to be more perceptible than those in the length of the barometrical column.

A series of experiments has also been made for testing the performance of the aneroid barometer under extremes of atmospheric pressure. The instrument, as usually constructed, has not been found, from these experiments, very reliable, though it may be improved, and thus serve as an indicator of minute atmospheric changes. I think, however, it will not answer for the determination of changes of atmospheric pressure of considerable magnitude.

For the better comprehending the relative position of the several places of observation, now embraced in our system of meteorology, an outline map of North America has been constructed by Prof. Foreman. This map is intended also to be used for presenting the successive phases of the sky over the whole country, at different points of time, as far as reported; and we have been waiting for its completion, to commence a series of investigations, with the materials now on hand, relative to the progress of storms.

A valuable collection of returns relative to the aurora has been received, in accordance with the special instructions which we have issued for the observation of this interesting phenomenon. These are to be placed in the hands of Captain Lefroy, of the Toronto Observatory, and incorporated with observations of a similar kind which he has collected in the British possessions of North America. An account in full of the whole series will be presented by Captain Lefroy, to be published in the Smithsonian Contributions.

The meteorological correspondence is under the charge of Professor Foreman. This is found not only to involve considerable labor in the way of arranging the regular returns and sending the required blanks and directions, but also in the discussion of questions on almost every branch of science propounded by the meteorological observers, which we think it our duty in all cases to treat with respect, and to answer to the best of our knowledge.

Researches, &c.

Explorations.—The programme of organization contemplates the institution of researches in Natural History, Geology, &c.; and, though the state of the funds would permit of little being done in this line, yet we have made a beginning. Besides the assistance rendered to the exploration of the botany of New Mexico, by the purchase of sets of plants from Mr. Wright and Mr. Fendler, as mentioned in my last report, a small sum was appropriated to defray the cost of transportation of the articles which might be collected by Mr. Thaddeus Culbertson, in the

region of the Upper Missouri. This gentleman, a graduate of the institutions at Princeton, had purposed to visit the remote regions above mentioned for the benefit of his health, and was provided by Professor Baird with minute directions as to the preservation of specimens and the objects which should particularly engage his attention. His journey was undertaken, and executed, under particularly favorable circumstances for exploration. He was accompanied by his brother, Mr. Alexander Culbertson, for many years connected with the American Fur Company, who was familiar with the whole country, and had himself sent valuable specimens of fossil mammalians to the Philadelphia Academy of Natural Sciences.

Mr. Culbertson first visited an interesting locality called the *Mauvaises Terres*, or Bad Lands, where his brother had previously found the remains of the fossils sent to the Academy. He afterwards ascended the Missouri, to a point several hundred miles above Fort Union. He returned in August last in renewed health to gladden the hearts of his parents and friends, with the prospect of long life and usefulness; but though he had withstood the privations and exposures of the wilderness, he sank under an attack of a prevalent disease and died after a few weeks' illness.

He left a journal of all the important events of his tour, which is thought of sufficient importance to be appended to this report.

For a particular account of the interesting specimens which he procured, many of which are new and undescribed, I must refer to the appended report of Professor Baird. A part of the specimens, those of the fossil remains, have been referred to Dr. Leidy, of Philadelphia, who will present the result of his investigations relative to them, for publication in one of the volumes of the Smithsonian Contributions.

A small appropriation has also been made to defray in part the expense of exploration, relative to the erosions of the surface of the earth, especially by rivers, and for investigations relative to terraces and ancient sea-beaches, under the direction of President Hitchcock. An abstract of these investigations, as far as they have been made, has been received by the Institution; and a full account of the whole, it is expected, will soon be ready for publication.

An exploration for the increase of the Smithsonian collection, particularly in fishes and reptiles, of which our knowledge is most imperfect, was undertaken by Professor Baird, accompanied by a number of young gentlemen, his former pupils. The result of this expedition, which cost the Institution little more than the price of materials and transportation, was a large number of specimens, including numerous species before unknown to science.

Experiments.—A series of experiments has been made, during the past year, under the direction of Professor Jewett, to test the value of a new plan of stereotyping. If the result of these experiments be favorable, it is proposed to purchase the right to use the invention, for the purposes of the Institution. Should the invention be found to possess the character to which it appears entitled, it will not only be of much importance to the Institution, but to the world; and we shall have done good service to the cause of knowledge, by giving it our countenance and assistance. Professor Jewett has found it especially

applicable to his system of stereotyping catalogues of libraries, by separate titles; and in this way it will certainly be of great value, even should it fail in other respects to realize the sanguine expectations of its inventor.

The result of the experiments will be submitted to a commission of persons properly qualified to judge of its merits; and if their report be favorable, a small sum will be allowed for the use of it.

Besides the experiments mentioned under the head of meteorology, made by Mr. Espy, on the cold produced by the rarefaction of air, Dr. Hare, of Philadelphia, is employing articles of apparatus belonging to the Institution, in a series of researches on the phenomena exhibited in the air and in a vacuum by rubbing silicious minerals against each other. The results of these experiments, with the drawings of the apparatus employed, he intends to present to the Institution in the form of a memoir for the Smithsonian Contributions to Knowledge.

Computations.

Occultations for 1851.—For the purpose of facilitating the accurate determination of geographical points in the United States, a list of occultations and the co-ordinates of reductions for the years 1848, 1849, and 1850, was prepared and published at the expense of the Smithsonian Institution. Congress has since ordered the publication of an American Nautical Almanac; and as lists of occultations will form a part of this ephemeris, Mr. Preston, late Secretary of the Navy, directed that the expense of computing these tables for 1850 should be defrayed from the appropriation for the Almanac, provided the printing and distribution were at the expense of the Smithsonian Institution. The same course has been authorized by Mr. Graham, the present Secretary of the Navy.

Copies of these tables, computed by John Downes, of Philadelphia, have been sent to all persons known to the Institution, who would probably make use of them in the way of improving our knowledge of the geography of this country. They have been furnished particularly to officers of the United States army, and other persons engaged in exploring our new possessions and determining their boundaries. All persons to whom these tables were presented, have been requested to send the result of their observations, made in connexion with the use of them, to this Institution, or to publish them in some accessible journal.

Ephemeris of Neptune.—It was stated, in the last Report, that the orbit of the planet Neptune, established by the researches of Mr. Walker, and comprised in his memoir published by the Institution, gives the data for calculating an ephemeris or tables of the daily position of this planet, rivalling in precision the tables for any of the older planets. Sets of these tables were computed and published for 1848 and 1849, at the expense of the Smithsonian Institution; but those for 1850 and 1851 have been computed under the direction of Lieutenant Davis, superintendent of the Nautical Almanac, and at the expense of the appropriation under his charge, while the expense of printing the tables has been borne by this Institution.

These tables are corrected for the perturbing influence of the planets Jupiter, Saturn, and Uranus, by deductions from mathematical investigations of Professor Peirce, of Harvard University. They have been used in following the motion of Neptune, by all the principal astronomers of the world, and have everywhere received the highest commendation, reflecting honor on the Institution, and on the science of the country.

Museum.

The act of Congress authorizing the establishment of the Smithsonian Institution contemplates the formation of a Museum of Natural History. It would not, however, be in accordance with the spirit of the organization, to expend the income in the reproduction of collections of objects which are to be found in every museum of the country. Natural history can be much more effectually promoted by special collections of new objects; by appropriations for original explorations and researches; and, above all, by assistance in the preparation of the necessary drawings, and by presenting to the world, in a proper form, the labors of naturalists. In conformity with these views, it has been resolved to confine the collections, principally, to objects of a special character, or to such as may lead to the discovery of new truths, or which may serve to verify or disprove existing or proposed scientific generalizations. A number of special collections, important in this point of view, are mentioned by Professor Agassiz, in the Appendix to my last Report; and, for a more enlarged statement relating to the same subject, I would refer naturalists to the accompanying report by Professor Baird, to whom the charge of the collections of natural history has been confided.

A considerable number of specimens in mineralogy, geology, and botany, had been received previous to Professor Baird's connexion with the Institution; and since he has entered upon his duties, a large addition has been made to the stock, by the deposite of his own cabinet, and by donations from various sources.

The collection is principally rich in undescribed species of fishes and reptiles; and especial care will be taken by Professor Baird to enhance its value, by procuring, in all cases, as far as practicable, such specimens as may help to solve questions of scientific interest. The collection has been arranged in one of the rooms of the basement story, so as to be available to the student in this branch of science, and has already done service in this way, by furnishing the facts given in one of the memoirs of the Smithsonian Contributions. Though letters are constantly received requesting the Institution to purchase collections of plants, minerals, and other objects of natural history, yet we have declined, in all cases, to avail ourselves of opportunities of this kind to increase the cabinet. Experience has, thus far, shown that specimens of all kinds will accumulate, from donations and exchange, as rapidly as they can be accommodated with room, and properly arranged.

I have given, in my last report, the reasons why it is not thought advisable, on the part of the Institution, to accept the gift, proffered by Congress, of the great museum of the Exploring Expedition, and I have no reason to change my opinion on that point.

For a detailed account of the specimens forming the Smithsonian collection, I refer to Professor Baird's report, herewith submitted.

American Antiquities.

During the past year we have received information of the locality of a number of mounds, and other remains of ancient art, in different parts of the United States. A gentleman is now engaged in the examination of the mounds of Western Virginia, with the intention of presenting the results of his labors for publication in the Smithsonian Contributions.

The survey of the mineral land in the vicinity of Lake Superior has disclosed the site of an ancient copper mine, whence, in all probability, the copper of the ornaments, instruments, &c., found in the mounds, was derived. The remains of the implements, and of the ore, as left by the ancient miners, are exhibited in place, and afford an interesting illustration of the state of arts among the mound-builders. The geological surveyors have promised to make accurate measurements and drawings of everything of interest connected with these works, and to present them, with suitable descriptions, to the Institution for publication.

Mr. E. G. Squier, during his sojourn in Central America, as chargé d'affaires of the United States, made some interesting explorations relative to the antiquities of that country, and has sent to this Institution five large stone idols and several smaller objects, as the beginning of an ethnological museum. For the cost of shipment and transportation of the three larger idols, by way of Cape Horn, the Institution is indebted to the liberality of B. Blanco, esq., of New York.

For some remarks relative to the importance of forming an ethnological museum, I beg to refer to a paper by Mr. Squier, given in the Appendix to this Report.

Apparatus and instruments of research.

It is a part of the plan of the Institution to appropriate a small portion of the funds to the purchase of sets of instruments for physical research, to be used by the officers of the Institution, and, under certain restrictions, by other persons. In accordance with this purpose, I was requested, by the Board of Regents, to procure an astronomical clock, with the electro-magnetic registering apparatus, to be lent to Lieutenant Gillis during the continuance of his astronomical labors in Chili. The clock has been imported from Germany, and is now in the hands of the instrument-maker to receive the registering attachments. The whole will be sent to Chili as soon as the apparatus is completed. I regret that the difficulty of procuring the services of suitable workmen has delayed so long the completion of these instruments.

A communication from Lieutenant Gilliss informs us that the Chilian government has resolved to establish a permanent national observatory at Santiago, and that it will purchase the instruments above mentioned. The institution will therefore again, as in the case, mentioned in a former Report, of the purchase of a telescope for the same expedition, be the means of promoting science without an expenditure of its income.

The apparatus for determining the elements of terrestrial magnetism, mentioned in my last Report as having been lent to Colonel Emory, has been delivered to Col. Graham, to be used on the Mexican Boundary Survey. To replace these, the Institution has received permission to order another set, from London, at the expense of the government; and thus, by an addition to the number of instruments of this kind, the means of promoting the science of terrestrial magnetism, in this country, will be increased.

The purchase of standard meteorological apparatus, and also the instruments which have been distributed to different important stations throughout the country, is a part of the same plan.

During the past year a considerable portion of the apparatus constituting the liberal donation of Dr. Hare, of Philadelphia, has been repaired and fitted up; and we hope, during the present season, to complete the repairs of the remainder, and to place the whole in a proper position for exhibition and use.

Library.

It has been stated, that the programme of organization is intended to harmonize the several requisitions of Congress, and the resolutions of the Board of Regents, with a system of active operations, the influence of which shall be as widely extended as practicable. Though almost every one will admit the value of libraries, and the importance of collecting in this country as great a variety of books as possible, yet it may well be doubted whether the accumulation of a large number of books which are to be found in almost every library of the country, is, in the present state of the funds, to be expected or aimed at. It is believed that a portion of the income devoted to the library may be more efficiently expended in the promotion of the desired ends by other means, and hence it was resolved to make special collections of books; particularly to procure such as are not in the country, and also, in order to render more available those which are now in our libraries, to prepare, as far as practicable, a general catalogue of all the books they contain.

In accordance with these views, Professor Jewett has devised a plan of facilitating the publication of catalogues of libraries, which bids fair to be of much importance to the literature of the country. This plan has been submitted for examination to a commission of gentlemen well acquainted with the subject, and we have received from them a very favorable report recommending its adoption.

The propositions submitted to the commission for examination, were as follows:

1. A plan for stereotyping catalogues of libraries by separate movable titles; and,

2. A set of general rules, to be recommended for adoption by the different libraries of the United States, in the preparation of their catalogues.

For a full account of Professor Jewett's plan, and of the advantages anticipated from it, I must refer to his report herewith submitted. I may, however, briefly allude to the leading principle of the plan, which

is to stereotype the titles of books on separate movable blocks. These blocks once prepared, and kept in a central depository, may be used for the printing of new editions of the catalogues for which they were originally made, allowing the interposition of additional titles in their proper order; as well as for the printing of all other catalogues containing the same titles. The collection of the stereotype blocks of the titles of the several libraries will thus form the stereotyped titles of a general catalogue of all the libraries. They will lend themselves to the construction of bibliographies of particular branches of knowledge, and will admit of being arranged alphabetically, chronologically, or in classes, in accordance with any required system.

These blocks are not to be made in advance of a demand for their use. They are to be gradually accumulated, by an arrangement, which, imposing only a temporary and light burden upon the funds of this Institution, will effect the great public object desired, at the same time that it diminishes to but a fraction of the present cost the expenses of publishing catalogues, and secures the construction of them upon a uniform and approved system.

The details of a plan so comprehensive may well be supposed to be difficult of adjustment, and not capable of being clearly described within the limits of a few paragraphs. These, however, have been fully considered by a competent tribunal; and the plan has received commendation and promises of co-operation from some of the principal institutions of the country.

During the last year, the library has continued to increase by donation, by receipts under the copyright law, by exchanges for the publications of the Institution, and by purchase. It now numbers, in all, nearly ten thousand separate articles, and bids fair, from the same sources, to become a very valuable collection.

Though one half of the annual interest is to be expended on the library and the museum, the portion of the income which can be devoted to the former will, in my opinion, never be sufficient, without extraneous aid, to collect and support a miscellaneous library of the first class. Indeed, all the income would scarcely suffice for this purpose. Still, by means of exchanges, donations, and purchases, a library of great value may be collected and sustained; and this, with the constantly increasing library of Congress, the libraries of the Departments, and that of Georgetown College, will furnish a collection of books not unworthy of the capital of this nation.

From the report of Professor Jewett, it will be seen that a Gallery of Art has been commenced, and that it is already in possession of a valuable collection of engravings.

In this connexion, I may mention that at the last annual meeting of the Board a letter was presented from the Hon. Abbott Lawrence, informing the Regents that a portrait of Smithson had been offered through him for sale to the Institution. This portrait, which was in the possession of the widow of John Fitall, a servant of Smithson, mentioned in his will, was purchased for thirty guineas, and is now in the Gallery of Art. It represents the founder of this Institution, in the costume of a student of Oxford, and was probably painted when he was not more than twenty years of age. There is, also, in the pos-

session of the Institution a medallion of Smithson, in copper, taken in after life. It is from this that the head on the title-page of the Smithsonian publications has been copied.

Lectures.

During the past session of Congress a series of popular lectures has been given to the citizens of this place and strangers, in the lecture-room of the Smithsonian building. These lectures were delivered by gentlemen distinguished for their standing, and for their attainments in literature and science, who were invited for this purpose. The interest in these lectures has been sustained to a wonderful degree. They have been attended from the first by large audiences; and the results thus far indicate that considerable good may be derived from the diffusion of knowledge in this way, in a central position like Washington, where persons from every part of the Union are found. Although the lectures appear to the public one of the most prominent objects of the Institution, and although they are attended with much trouble and considerable expense, they really form the least important feature of the plan adopted. So long, however, as there is a prospect of doing good by means of them, it is due to the city in which the Institution is located that they should be continued.

Much complaint has been made on account of the size of the lecture-room. It is certainly too small to accommodate all who have wished to attend. We have, however, endeavored, in several instances, to obviate this difficulty, by procuring a repetition of the lectures; but this plan is attended with additional expense, and cannot, in all cases, be adopted. Should large audiences continue, it may be well to provide a larger lecture-room in the main building, and, by removing the seats from the present lecture-room, convert it into a museum of apparatus. This change, if thought advisable, can be made at very little, if any, additional expense; since the present wood-work of the interior of the main building is to give place to a fire-proof structure, which will admit of being arranged as a lecture-room. Indeed, the original plan contemplated a room of this kind in the main building; but the arrangement of it was such as to seat scarcely more than the room at present used.

Many inquiries are made as to the publication of these lectures. In some cases, reports of them have been given in the newspapers, and it will be advisable to extend this practice to all; but the publication, in a separate form, of lectures, which in many cases are not written out, and not intended by their authors as additions to knowledge, would be attended with much expense and little useful effect. The Institution, in several instances, is doing better service, by publishing in full the original researches on which the lectures are based. The papers of Professor Agassiz, of Professor Harvey, and of Lieutenant Davis, are of this character, and will be given to the world through the Smithsonian Contributions.

The following is a list of the Titles of Lectures given before the Institution during the last session of Congress, with the names of the distinguished gentlemen by whom they were delivered:

A single lecture on Holland, by the Rev. Dr. George W. Bethune, of Brooklyn, New York.

A course of lectures on the Relations of Time and Space, the Vastness of the Visible Creation, and the Primordial Arrangement of Existing Systems; by Professor Stephen Alexander, of Princeton, New Jersey.

A course of lectures on Science applied to Agriculture, by Professor J. F. W. Johnston, of the University of Durham, England.

Two lectures, one on the Tendencies of Modern Science, and the other on the Spirit of the Age; by the Rt. Rev. Bishop Alonzo Potter, of Pennsylvania.

One lecture on the Ability of the Individual to Promote Knowledge; by the Rev. John Hall, of Trenton, New Jersey.

A course of lectures on the Unity of the plan of the Animal Creation; by Professor Louis Agassiz, of Cambridge, Massachusetts.

A course of lectures on the Tides of the Ocean and their Geological Relations; by Lieutenant Charles Henry Davis, of the United States navy.

A course of lectures on Marine Algæ or Sea Weeds, and also on the Morphology of the Vegetable Kingdom; by Professor William H. Harvey, of the University of Dublin, Ireland.

Two lectures, one on the Origin and Growth of the Union during the Colonial Period, and the other on some points of the History and Peculiarities of the English Language; by Professor Henry Reed, of the University of Pennsylvania.

A course of lectures on the Chemical Operations of Nature; by Professor Lewis C. Beck, of Rutgers College, New Jersey.

The first part of a general course, giving an exposition of the Dynamical Phenomena of Geology; by Professor Henry D. Rogers, of Boston.

Whatever may have been the effect of these lectures in the way of diffusing knowledge, it is evident, from the character of the men by whom they were delivered, that they presented truths intended to elevate and improve the moral and intellectual condition of the hearers.

All of which is respectfully submitted:

JOSEPH HENRY,
Secretary of the Smithsonian Institution.

FIFTH ANNUAL REPORT

Of the Secretary of the Smithsonian Institution, for the year 1851.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: Besides the care of all the property of the Institution, and the responsibility of the direction of its operations, under the control of the Regents, the Secretary is required to give an account, at their annual session, of the condition of the Institution, and of its transactions during the preceding year.

In the discharge of this duty on the present occasion, I am happy to inform the Regents, that the Institution under their care is still in a prosperous condition, and that since their last meeting it has continued, silently but effectually, to enlarge the sphere of its influence and usefulness, and to elicit from every part of the civilized world commendations not only of the plan of organization it has adopted, but also of the results it has produced.

In my last Report I gave a brief account of the means employed to increase the income, so that in addition to the requirements of Congress in regard to the formation of a library and a museum, and the erection of a building on a liberal scale, operations of a more active character could be incorporated into the plan of organization.

During the past year the same policy has been observed; and though the officers of the Institution have been subjected to the inconvenience of transacting business in an unfinished building, and in rooms not intended for the purpose, yet this has been considered of minor importance in comparison with the saving of the funds. Every dollar now expended on the building lessens the amount of accruing interest, and diminishes the means of producing results which are to affect the world at large; hence the importance of an adherence to the plan of finishing it by degrees. Since the last session of the Board, it has, therefore, not been thought advisable to urge the contractor to a rapid completion of his work, and all the expenditures on account of the building have been made from the accrued interest of the current year, and from a portion of that of the year preceding. There is, consequently, still on hand the two hundred thousand dollars of accumulated interest mentioned in the last and preceding reports. Of this, it will be recollected, $50,000 are to be applied towards finishing the building, and the remainder to be invested as part of the principal.

The importance of increasing the funds and of gradually developing the operations embraced in the programme, was set forth in the last report. The Institution, it is to be hoped, is not one of a day, but is to endure as long as our government shall last; it is therefore necessary, in the beginning, that we should constantly look to the future, and guard against the temptation, to which we are continually exposed, of expanding too rapidly.

By a resolution of the board, at their session in 1849, the Secretary was directed to petition Congress to take from the Institution $150,000,

and such other sums, not exceeding in all $200,000, as may have been or shall be received in accruing interest or otherwise, upon the same terms as those on which the original bequest had been accepted. This petition was referred to a committee and favorably reported upon; but unfortunately the press of business prevented Congress from acting upon it at their last session. The petition will again be renewed; and it is believed that so reasonable a request will meet with a favorable reception. It is, however, thought important that the amount should be increased, and that the sum of $250,000 be inserted in the petition, instead of that named in the resolution.

In addition to the $150,000 which the Regents thus seek to invest, there is still a portion of the original legacy remaining in England, as the principal of an annuity settled upon Madame De la Batut, the mother of the nephew of Smithson, to whom the property was originally bequeathed. besides this, I am informed, upon good authority, that the Institution is the contingent legatee of an estate of considerable magnitude, depending on the demise without issue of a single individual. We may also reasonably expect that if the affairs of the Institution are properly conducted, and its funds judiciously husbanded or properly expended on the legitimate objects of the bequest, other trusts will be committed to its care. It therefore becomes important that the limit should be at least $250,000, so that the whole sum, including the original bequest, shall amount to a little more than $750,000. There can surely be no just grounds of fear that the income of this sum will be devoted to improper uses, so long as it is an essential part of the plan to produce fruits, the value of which can be judged by all who are capable of appreciating the advance of knowledge. This request is also in accordance with the policy adopted by the Institution of asking nothing from Congress but the safe-keeping of its funds, and the appointment to its Board of Regents of gentlemen of intelligence and high moral principles.

The government has thus far liberally fulfilled the obligations which it imposed upon itself in accepting the trust. Not only has the original sum been permanently invested in the treasury of the United States, but interest has been allowed from the time of receiving the funds. Congress has also made several donations to the Institution, which, though they will not prove as valuable to us as could be wished, indicate a liberal intention. The first gift was the great museum of the Exploring Expedition, for the accommodation of which the larger portion of the present building was originally intended; the second was a grant of nineteen acres of land surrounding the building of the Institution; the third, a copy of every book published in the United States for which a copyright might be granted; the fourth and last gift was that of all the plates, manuscripts, &c., of the Exploring Expedition, for the purpose of publishing a new edition for distribution.

These donations, though made with kindly feelings and in a spirit of liberality, have proved singularly unprofitable. The maintenance of the museum of the Exploring Expedition would subject the Institution to an annual expense which would materially interfere with more important operations. After expending several thousand dollars on the improvement of the grounds, it has been deemed best to return

them to the charge of the general government. Were the copyright act fully complied with, perhaps some benefit might accrue from it to the Institution; but in the manner in which it is at present observed, the expense of postage and of clerk-hire in recording the titles and furnishing the certificates of deposit, has more than equalled the value to us of all the books received. Lastly, it has been estimated that the publication of a new edition of the expensive volumes of the results of the Exploring Expedition would cost at least fifty thousand dollars. Fortunately, it has not been considered obligatory on the Institution, except in the case of the copyright law, to accept these gifts.

Publication of Memoirs.

Since the adoption of the plan of organization, nearly fifty original memoirs, purporting to be additions to the sum of human knowledge, have been presented to the Institution for publication. Though a number of these have been returned to their authors, principally on account of not falling within the restricted class of communications accepted for publication, yet they have generally been productions of much merit, and have evinced a surprising activity of mind, and manifest a growing attention in this country to original research. The probable success of this part of the plan of organization was not overrated; for, were the whole income of the Institution devoted alone to publishing the results of the labors of men of literature and of science, which otherwise would never see the light, it could be profitably expended. In this respect, the Smithsonian bequest supplies the wants which in Europe are met by richly endowed academies and national societies.

It will be recollected that each memoir is printed separately, and with a separate title and paging, so that it can be distributed to persons most interested in its perusal as soon as it comes from the press, without waiting for the completion of the volume to which it belongs. In this way, the author is enabled to present a full account of his discoveries to the world with the least possible delay; while, by the rules of the Institution, he is allowed to publish an abstract of his paper in the proceedings of the American Association for the Advancement of Science, or in those of any other properly organized society.

The number of copies of the Smithsonian Contributions distributed is greater than that of the transactions of any scientific or literary society; and therefore the Institution offers the best medium to be found for diffusing a knowledge of scientific discoveries.

Every memoir published by the Institution is issued with the stamp of approval of a commission of competent judges: and in order to secure a cautious and candid opinion, the name of the author, and those of the examiners, are not made known to each other unless a favorable report is given; and, in this case, the names of the commission are printed, as vouchers for the character of the memoir, on the reverse of the title-page.

This plan secures an untrammelled expression of opinion, while it induces caution on account of the responsibility which it involves.

Besides deciding on the fitness of original memoirs for publication, the Institution is continually applied to for information relative to almost

every department of literature and science. Respectful attention is always given to these applications; and when the desired answer does not fall within the line of study of any officer of the Institution, it is sought for from those in whose knowledge and judgment we have full confidence. No inconsiderable portion of time is occupied in giving the information involved in the answers to these inquiries; but I am happy to inform the Board that in this service, as well as in that of examining memoirs, we have received the co-operation of a considerable number of the most distinguished individuals in our country, and in scarcely a single case has application for assistance in this way been refused. By the operation of the plan adopted, the Institution can command the talents and the learning of the world, and with a small corps of permanent officers, or a sufficient clerical force, can discharge the duty of an association to which subjects relative to all branches of knowledge can be referred.

There is one class of requests which, by a resolution of the Board of Regents, we are directed to refuse, viz: those for the examination and approval of the innumerable inventions by which the ingenious and enterprising seek to better their own condition and that of the public. Were it not for this resolution, originally proposed by General Cass, we would be overwhelmed with applications of this kind, and have forced upon us the business of the Patent Office. Besides this, the principal object of the organization is the discovery of new truths, rather than the application of known principles to useful purposes. Not that we would undervalue the labors of the inventor; but because practical knowledge has a marketable value which always insures its cultivation, provided the higher philosophical truths on which it is founded are sufficiently developed and made known.

The idea is still very generally entertained that Smithson bequeathed his property to this country for the diffusion of useful knowledge among the people, and that his intention would be best consulted by the expenditure of all the income in the publication and general distribution of tracts on practical subjects. The adoption of this plan would be to dissipate the funds without beneficial effect. A single report of the Patent Office costs, in some instances, more than three times the income of the Smithsonian fund, which itself would be insufficient for the general diffusion of a single octavo page of printed matter. The property, however, was not left to the inhabitants of the United States, but to the government, in trust for the good of man; and not merely for the dissemination or diffusion of knowledge, but, first of all, for creating, originating, increasing it. Furthermore, Smithson does not confine his bequest to the promotion of *useful* knowledge alone, in the lower sense of the term, but includes all knowledge in his liberal and philosophical design. The true, the beautiful, as well as the immediately practical, are all entitled to a share of attention. All knowledge is profitable; profitable in its ennobling effect on the character, in the pleasure it imparts in its acquisition, as well as in the power it gives over the operations of mind and of matter. All knowledge is useful; every part of this complex system of nature is connected with every other. Nothing is isolated. The discovery of to-day, which appears

unconnected with any useful process, may, in the course of a few years, become the fruitful source of a thousand inventions.

That the encouragement of the discovery of new truths, the publication of original memoirs, and the establishment of new researches, are in conformity with the design of Smithson, is not only manifest from the terms of his will, but also from the fact, which has lately come to our knowledge, that he at first left his property to the Royal Society of London, for the very object embraced in this part of the plan. And what prouder monument could any man desire than the perpetual association of his name with a series of new truths? This building and all its contents may be destroyed; but the volumes of the Smithsonian Contributions, distributed as they are among a thousand libraries, are as wide-spread and lasting as civilization itself.

During the past year a number of memoirs have been accepted for publication, and are either in the press or are waiting the drawings to illustrate them, now in the hands of the engraver. It is the duty of the Secretary, in accordance with the original plan of the Institution, to give a popular account of these memoirs in his annual report.

1. The first is a memoir by Dr. Asa Gray, professor of botany in Harvard University, consisting of an account of a collection of plants made by Mr. Charles Wright, in an expedition from Texas to El Paso, in the summer and autumn of 1849.

It was stated in my report for that year that one hundred and fifty dollars had been subscribed on the part of the Institution toward the outfit of Mr. Wright, and that the plants collected by him would be submitted to Dr. Gray for examination and description. The memoir now mentioned is the result of this arrangement, though it also contains notices of plants gathered by other collectors in adjacent regions, especially by Dr. Wislizenus in the valley of the Rio Grande and Chihuahua, and by the lamented Dr. Gregg in the same district, and in the northern part of Mexico. This memoir is a good exposition of the character of the vegetation, and consequently of the climate, of the regions traversed.

Specimens of all the plants obtained by Mr. Wright belong to this Institution; and these, with sets collected by Fendler and Lindheimer, form the nucleus of an important and authentic North American herbarium.

2. Another paper on botany is by Dr. John Torrey, of the college of New Jersey, Princeton. It gives illustrations of the botany of California, and describes a number of new and interesting plants discovered by Colonel Frémont in his different explorations in that country.

Some of the plants collected by this intrepid traveller have been described in the appendix to his first and second report, but many are still unpublished. Of the collections made during his third expedition no descriptions have been given, except that two or three of the new plants were briefly characterized by Dr. Gray, in order to secure priority of discovery.

In the memoir presented to the Institution, Dr. Torrey has given descriptions of a number of genera of new and remarkable plants, all collected by Colonel Fremont in the passes and on the sides of the Sierra Nevada. With regard to this publication Dr. Torrey remarks, that he had hoped that arrangements would have been made by the govern-

ment of the United States for the publication of a general account of the botany of California; but as there is no immediate prospect of such a work being undertaken, this memoir, on some of the more interesting genera discovered by Colonel Frémont, has been prepared for the Smithsonian Institution.

The drawings to illustrate this paper have been made, at the expense of the Institution, by Mr. Isaac Sprague, of Cambridge, who, in the opinion of Dr. Torrey, ranks among the best botanical draughtsmen of our day.

3. The next paper presents the results of a series of observations made in the years 1845–6–7, to determine the dip, inclination, and intensity of the magnetic force in several parts of the United States, by John Locke, M. D., professor of chemistry in the Medical College of Ohio. The results presented in this paper are a continuation of a series derived from observations begun in 1837, and prosecuted annually for ten years. The first parts of the series have been published in the Transactions of the American Philosophical Society, and have been incorporated by Colonel Sabine in his contributions to Terrestrial Magnetism. A part of the observations given in this memoir were made at the expense and under the direction of the United States Coast Survey. Another portion was made in accordance with the direction of the Hon. Robert J. Walker, late Secretary of the Treasury, as a part of the investigations instituted for the exploration of the mineral lands belonging to the general government. This paper has been examined by competent judges, and recommended for publication in the Smithsonian Contributions, as an important addition to knowledge.

4. A paper has also been presented for publication by the executors of the late Dr. Troost, of Nashville. It consists of descriptions and drawings of a very numerous family of extinct zoophytes, to which the organic remains, called the stone lily; belongs. The vicinity of Nashville appears to be a remarkable locality for these remains; and the paper of Professor Troost describes several hundred species, of which two only have living representatives.

The memoir, however, is not in a condition to be published without revision, and additions to bring it up to the state of knowledge at the present time. This labor has been gratuitously undertaken by Professor Agassiz, of Cambridge, and Professor James Hall, of Albany. The collection of specimens from which the drawings were made is now in the possession of these gentlemen, and the memoir will be published as soon as the corrections and additions are made.

5. The next memoir is on the Winds of the Northern Hemisphere, by Professor James Coffin. The design of this communication, in the words of the author, is "to answer the following questions, viz:

"*a.* What is the average direction in which the lower strata of the air moves over different regions of the northern hemisphere?

"*b.* What is the rate of progress in the mean direction as compared with the total distance travelled by the wind?

"*c.* What modifications do the mean direction and rate of progress undergo in the different months of the year?

"*d.* What is the direction of the deflecting forces that cause these modifications?

"*e.* What is the average relative force and velocity of winds from several points of the compass?

"*f.* How will the introduction or omission of the latter element affect the answer of the preceding questions?"

The data used in answering these questions have been collected with great labor, and consists of observations made at no less than five hundred and seventy-six different stations on land, and a large number taken during numerous voyages at sea. The field of observation includes a zone which extends from the equator to near the parallel of 85° of north latitude, and occupies a period, taken in the aggregate, of 2,800 years.

Several of the foregoing questions have been answered approximately by other writers, but never, it is believed, from as extensive an induction as is presented in this memoir.

The paper is illustrated by a number of maps and diagrams, which render its publication very expensive. It was presented to the Institution more than a year ago, but the appropriation for printing was not sufficient to allow of its publication at that time.

6. The Institution has also commenced the publication of an extended memoir, consisting of a grammar and lexicon of the Dakota language, the results of the joint labors during eighteen years of the Dakota mission, assisted by the most intelligent natives of this tribe of Indians. The whole has been arranged and placed in its present form by the Rev. S. R. Riggs, of the American Board of Missions.

This work was prepared under the auspices of the Historical Society of Minnesota, and recommended by this association to the favorable attention of the Smithsonian Institution. It is designed to meet the requirements of the missionary in his labor of diffusing the light of religion and civilization among one of the most numerous and important tribes of Indians in the country. It also forms an interesting addition to ethnology, which will be highly prized by all devoted to this branch of knowledge.

A language is not originally a thing of man's device, or the result of conventional art, but the spontaneous production of human instinct, modified by the mental character, the physical conditions, and other peculiarities of the people or tribe among whom it had its origin, or by whom it is used. It is subject to definite laws of formation and development, and is intimately connected with the history of the migrations and affiliations of the people by whom it is spoken, and hence becomes an object of interest to the student of the natural history of man.

In accordance with the policy of not expending the Smithsonian fund in doing with it what could be equally well done by other means, this memoir was first referred to the Bureau of Indian Affairs, with the hope that it might be adopted as a part of the materials of the volumes published under the direction of that bureau; but this was not found practicable, and the task was therefore undertaken by the Institution.

The memoir will occupy an entire volume, and would have been too much for our present income, had not about one third of the whole cost of publication been promised by subscription from the members of the Historical Society of Minnesota and the American Board of Missions. The latter institution defrays the expenses of Mr. Riggs while he is en-

gaged in superintending the passage of the work through the press. It is a pleasant circumstance that in this instance, as well as in many others, the organization of the Institution enables it to co-operate with other institutions, and to assist them in their labors of promoting knowledge.

This memoir, which is now in the press, was referred for critical examination to Professor Felton, of Cambridge, Massachusetts, and to Professor Turner, of New York. The latter has furnished us with a report on the importance of collecting information relative to the different dialects now in use among the Indians.

7. Dr. Joseph Leidy, of Philadelphia, has prepared a memoir for the Institution, accompanied by numerous illustrations, entitled "A Flora and Fauna within living Animals." It is an elaborate history of a most remarkable series of plants, in many cases accompanied by parasitic animals, found growing, as an ordinary or natural condition, within the interior of the bodies of living animals. In some of the latter, it is stated, growing plants are never absent; and in a species of insects, viz: *Papulus Cornutus*, a forest of vegetation is always found covering the inner surface of the *ventriculus* or second stomach.

The plants of course are Cryptogamic, and are algoid in their character. Some are as long as half an inch, but usually they are very much smaller. They grow attached to the mucous membrane of the cavities in which they are found, and occasionally form the exterior covering of worms infesting the same cavities. Several genera and species of these plants are characterized under the names of *Enterobryus elegans*, *E. attennatus*, *Arthromitus cristatus*, *Cladophytum comatum*, and *Corynocladus radiatus*.

The mode of growth and reproduction of several of the species has been carefully traced and fully illustrated by figures.

The researches are prefaced by some observations on the laws of parasitic life in general, which are presented in a highly philosophical manner, and entirely free from hypothesis—the whole forming one of the most remarkable papers on physiology which has ever been produced by our countrymen.

8. Lieutenant Charles Henry Davis, United States navy, Superintendent of the American Nautical Almanac, has presented a memoir on the dynamic effects of the tides.

This memoir is a continuation of one presented by the author to the American Academy a few years ago, and is of much interest, not only in a scientific point of view, as connected with important geological changes, but also on account of its practical bearings upon the transformations which are constantly going on at the entrance of rivers, channels, and in the formation of headlands and promontories. Were our globe a perfect spheriod of revolution, surrounded by water of uniform depth, the tides of the ocean would consist of nearly perpendicular undulations of the particles of the liquid, and a mere translation of form, without a transference of matter. But, in the case of a globe of irregular surface, covered with water of varying depth, the oscillations of the ocean must constantly produce currents in definite directions, which tend continually to change the position of the movable materials which are found at the bottom of the sea, particularly as we approach

land. A part of the force of the particles of water forming the sinking swell of the wave, in the case of an obstruction to their free descent by a diminished depth, is expended in producing a current along the inclined plane of the surface leading to the shore.

Lieutenant Davis has entered with much ardor upon this new field of research, and after an examination of various parts of the shore of the United States, through a series of years, in which he was engaged on the Coast Survey, has succeeded in developing the laws of action which give rise to the changes before mentioned.

He finds that the tendency of the flood-tide is to transport the matter from the bottom of the ocean and deposit it on land. He is enabled to explain the character of the alluvial formations, to account for their peculiar shape, their comparative sizes, their accumulation, and to predict the results of certain combinations of circumstances on their future changes. The particular object of this memoir is to inquire into the mechanical operations of the tides, and the uses they may have served in the general economy of the globe in arranging the loose materials of the earth's crust.

Smithsonian Reports and other publications.

Since the last meeting of the Board of Regents, the report of Professor Jewett on the Public Libraries of the United States has been published and widely distributed. It is impossible to collect at once full and reliable accounts of all the libraries of the country, and this report is intended merely as a beginning, to be followed by others on the same subject. It has been sent to all the libraries of the United States, with the request that its deficiencies may be pointed out and additional materials furnished to render it more perfect. The great interest which is felt in this work is manifested by the amount of statistical information which has already been received in return for this volume.

A report has also been published on the Recent Improvements in the Chemical Arts. It is compiled from articles which have appeared during the last ten years in the various journals of science and the arts in the English, French, and German languages. Though this report is chiefly intended to benefit the practical man, yet it will be found interesting to the general reader, as exhibiting the contemporaneous advance of science and art, and the dependence of the latter on the former for the improvement of its most important processes.

The accounts given in the report alluded to do not consist of descriptions of methods which have been merely proposed and published without practical verification. On the contrary, care has been taken to select such as have been actually tried, or such as offer great probability of success from the well established principles on which they are based.

The preparation of this report was entrusted to Professor James C. Booth, assayer of the United States Mint at Philadelphia, who associated with himself Mr. Campbell Morfit, of Baltimore. The work has been executed in a manner highly creditable to the authors, and will, I doubt not, prove very acceptable to the public. Notes will be made of the new inventions of the same class, as they appear in the

journals, so that, in the course of a few years, another report of a similar kind, or one which may be considered a continuation of this, can be published.

Copies, at the mere cost of printing, paper, and commission, are offered for sale. The matter has been stereotyped, in order to supply all the demand, and to reproduce this member of the series, should the subject be continued.

The progress of the elaborate report on the Forest Trees of North America, mentioned in the last two Reports, was for some time arrested by the absence of the author, Dr. Gray, in Europe. He has now, however, returned, and will resume the preparation of the drawings as soon as the funds of the Institution will admit of the expenditure. This work has proved a more expensive undertaking than was at first anticipated, and can only be finished on the original plan, by extending the time of its publication over several years. It will form a valuable contribution to the botany and economical and ornamental arts of our country.

Dr. F. G. Melsheimer, of Dover, Pennsylvania, has presented to the Institution a catalogue of the coleopterous insects of North America, with references to the principal places of description. This has been put to press, but progresses slowly on account of the great care necessary in correcting the proofs. When printed, it will be of great service to the cause of American entomology.

Besides the reports, other works are in progress, among which may be mentioned a small volume by Professor Baird, consisting of practical directions for the collection and preservation of specimens of natural history. This will be illustrated with numerous figures, and issued as soon as the engravings can be procured. A part of the letter-press has been finished. It is especially designed for the use of travellers and officers of the army and navy who may be inclined to make collections for the Smithsonian Institution, but will be of general interest to the cultivators of natural history.

A volume of tables of use in meteorology and other branches of scientific observations has been prepared, under the direction and at the expense of the Institution, by Professor Arnold Guyot. The following are the contents of this volume, viz:

1. Thermometrical tables for the conversion of the scales of different thermometers into each other.

2. Hygrometrical tables giving the elastic force of vapor, the relative humidity, &c.

3. Barometrical tables for the comparisons of different scales, reduction of observations to the freezing-point, and correction for capillary action.

4. Hypsometrical tables for calculating altitudes by the barometer, and by the difference of the boiling-point.

5. Tables of the corrections to be applied to the monthly means to obtain the true mean.

6. A set of miscellaneous tables frequently required in physical investigations.

These tables supply a desideratum in the English language, and will doubtless be highly prized by all engaged in physical research. It is

proposed to extend their number so as to include a wider range of objects, and to publish them in parts to suit different purposes. Copies will be distributed with the quarto volumes of our publications, and sent to meteorological observers. The tables have been stereotyped, and may therefore be offered for sale at a low rate.

Since the date of the last Report, a number of separate memoirs have been bound together so as to form the second volume of the series of Smithsonian Contributions. The memoirs, an account of which has just been given, will be ready for distribution during 1852.

The second volume has been forwarded to all the colleges and other institutions specified in the rules adopted for the distribution of the Smithsonian publications in this country, and to all the first-class libraries and principal literary and scientific societies abroad. Through the liberality of the members of the Senate of the United States and its officers, we have been enabled to send to our foreign correspondents, in addition to our own publications, copies of reports to Congress and other works published at the expense of government. In return, the Institution has received a series of flattering acknowledgments and valuable presents, not only of the current numbers of Transactions, but in several instances of entire sets of all the volumes.

The promotion of knowledge is much retarded by the difficulties experienced in the way of a free intercourse between scientific and literary societies in different parts of the world. In carrying on the exchange of the Smithsonian volumes, it was necessary to appoint a number of agents. Some of these are American consuls, and other respectable individuals, who have undertaken in most cases to transact the business free of all charge, and in others for but little more than the actual expense incurred. These agencies being established, other exchanges could be carried on through them and our means of conveyance, at the slight additional expense owing to the small increase of weight; and we have accordingly offered the privilege of sending and receiving small packages through our agency to institutions of learning, and in some cases to individuals, who choose to avail themselves of it. The offer has been accepted by a number of institutions; and the result cannot fail to prove highly beneficial, by promoting a more ready communion between the literature and science of this country and the world abroad.

As a part of the same system, application was made through Sir Henry Bulwer, the British minister at Washington, for a remission of duties on packages intended for Great Britain; and we are informed that a permanent arrangement will probably be made, through the agency of the Royal Society, for the free passage through the English custom-house of all packages from this Institution.

The Smithsonian exchanges are under the special charge of Professor Baird, who has been unwearied in his exertions to collect proper materials, and to reduce the whole to such order as will combine security with rapidity of transmission.

The system of exchange here described has no connexion with that established between national governments by Mr. Vattemare. It is merely an extension of one which has been in operation on a small scale for nearly half a century between the American Philosophical Society

and the American Academy on this side of the Atlantic, and the several scientific societies on the other.

Ancient Monuments.

The success of the first memoir published by the Smithsonian Institution has awakened much attention to American antiquities, and a number of communications have been submitted on this subject. Among these is one by Mr. William Pidgeon, of Virginia, who has spent a number of years in the exploration of mounds, and other ancient remains, on the upper branches of the Mississippi.

The results of his labors are of a very interesting character, though the facts contained in his memoir are too much mingled with the traditions received by him from the Indians, and with his own hypotheses, to be accepted as a part of the Smithsonian contributions. After repeated conversations with Mr. Pidgeon, I was clearly of the opinion that his researches ought to be given to the public in some way, in order that his statements might receive due attention, and be corroborated or disproved by other explorers; and I am pleased to be able to state that a gentleman of Washington has undertaken to arrange and edit these researches, and that they will be published in a separate volume for the benefit of the authors.

We have also received communications relative to mounds from Mr. Charles Whittlesey, of Ohio, from Mr. Titian R. Peale, of Washington, and Mr. William E. Guest, of Ogdensburg, New York. The first of these may be considered as supplementary to the memoir of Messrs. Squier and Davis, describing works omitted in their survey. The second gives a plan and description of the mounds which formerly existed on the present site of St. Louis, Missouri, made during the visit of Major Long's party in 1849 to that country, on their way to the Rocky mountains. This sketch is now interesting on account of the fact that, in the rapid progress of improvement, these mounds have been nearly obliterated, and that they can only be preserved to science, as they existed more than thirty years ago, by this publication.

The third is an account, with drawings, of ancient works at Prescot, in Canada West. The great size of the remains of trees which occupy the ground, evinces the long time which must have elapsed since these works were constructed, and the entire absence of stone pipes and arrow-heads has induced the belief that they are of a higher antiquity than those in the Ohio valley.

The last two contributions will form a single memoir, the plates for which are partially completed.

But the most interesting circumstance connected with the study of the ancient remains of this country is a recent action of the American Antiquarian Society of Worcester, Massachusetts. This institution was founded in 1812, by the zeal and liberality of Isaiah Thomas, for the purpose of collecting and preserving such manuscripts, pamphlets, and other articles as relate to the history of this country, and for the exploration and publication of its antiquities. It was at the expense of this society that the original researches of Mr. Atwater, on the mounds of the Ohio valley, were first published; and during the last two years

the condition of its funds has again enabled it to take the field, and to direct its attention to the remarkable antiquities in the State of Wisconsin.

These antiquities, it is well known, consist of representations, on a gigantic scale, of birds, beasts, and fishes; and though many of them have been surveyed, and accounts of them given in the memoir of Messrs. Squier and Davis, comparatively few of those which are said to exist have been explored or delineated. For this reason, the council of the society have engaged Mr. I. A. Lapham, an experienced engineer, to make the explorations and surveys and drawings of these mounds. He has been engaged in these operations for two seasons, and is now employed in making up an account of his labors.

To insure harmony of action in the cultivation of the wide field of research offered in the investigations of the ancient monuments of this country, the Antiquarian Society has agreed to present to the Smithsonian Institution the results of the explorations of Mr. Lapham for publication, and to reserve its limited funds for further explorations. The memoirs will be examined and revised by the society, and will be published under its auspices in the Smithsonian Contributions.

This arrangement is another pleasing evidence of the feeling with which the efforts of this Institution are regarded, and the willingness with which other institutions co-operate with it in the important work of promoting original knowledge.

Explorations, Researches, &c.

During the last year several minor explorations have been made in the line of natural history, partly at the expense of the Institution. The sum of fifty dollars was appropriated to Professor C. B. Adams, of Amherst College, to pay in part his expenses while making collections in the West Indies and Panama. For the sum advanced, an ample return has been made in new and rare specimens. Professor Baird and Mr. Charles Girard have also made explorations which have added to the collections of the Institution, at a cost little beyond that of the expense of transportation.

In this connexion I may mention that Professor Baird has contributed the report on the vertebrate animals collected by Captain Stansbury in his expedition to the Salt Lake region, and facilities have been given at the Institution to a number of persons making scientific reports to Congress.

A series of experiments also have been made in our laboratory by a commission appointed by government to examine the stone proposed for the extension of the Capitol. It is believed that the Institution may, in the aid it affords the government in scientific operations, more than repay all the obligation imposed by the acceptance of the Smithsonian trust.

It was mentioned in the last report that the specimens which were procured by Mr. Culbertson, from the upper Missouri, had been referred to Dr. Joseph Leidy, of Philadelphia, for examination. He has since made a report giving a brief statement of the results of his investigation. From this report it appears that the speci-

mens are of much scientific interest, showing, as they do, for the first time, the existence in this country of an eocene deposite, rivalling in the number of its species of extinct animals the celebrated basin of Paris.

Occultations.

It has been mentioned in the preceding reports, that lists of occultations, and tables of reductions, have been published, from 1848 to 1851, inclusive. The cost of the computation of these tables, as well as that of their publication for the past two years, was borne by the Institution, but since then Congress has ordered the establishment of an American Nautical Almanac; and as these tables will form a part of this ephemeris, Mr. Preston, the late Secretary of the Navy, directed that the expense of the computation should be defrayed from the appropriation for the Almanac, the printing and distribution to be at the charge of the Institution. A similar order has been given by the Hon. Wm. A. Graham, the present Secretary of the Navy, relative to the tables for 1851 and 1852.

The tables for 1852 are much extended by the introduction of occultations visible in every part of the earth. The form is also somewhat altered, in order better to adapt it to the arrangement to be adopted by the Nautical Almanac.

The primary object of these tables is to facilitate the accurate determination of the longitude of places within the territory of the United States; and in this respect they have done good service, especially in the hands of the officers of the Coast Survey, and the explorers and surveyors of our new possessions on the coast of the Pacific. Their extension will render them useful to geographers in every part of the world. They have been computed, for the present and the last two years, under the direction of Lieut. Davis, the accomplished superintendent of the American Nautical Almanac. As soon as this work, which will be an honor to the country, is ready to be issued, the publication will be relinquished by the Smithsonian Institution.

We observe again, in this case, the policy of not expending the funds of the Institution in doing what other means can accomplish.

It will be recollected that Mr. Sears C. Walker, astronomical assistant of the United States Coast Survey, prepared for the Smithsonian Transactions a memoir containing a determination of the true orbit of the planet Neptune, and that from this orbit, and the mathematical investigations of Professor Peirce, an ephemeris of Neptune was compiled. The ephemeris was prepared for the years 1848 and 1849, under the direction and at the expense of this institution; but for the years 1850, '51, '52, it was computed under the superintendence of Lieutenant Davis, and at the expense of the appropriation for the Nautical Almanac, while the cost of printing and of the distribution has been defrayed by the Institution.

The ephemeris has been generally adopted by the principal astronomers of the world; and Professor Airy, the astronomer royal of Great Britain, has undertaken the labor, in his last volume of Greenwich Observations, of critically comparing his observations on the planet in

the heavens with the predictions of the Smithsonian ephemeris. From these comparisons it is found that the ephemeris gives the position of the planet with a degree of precision not inferior to that with which the places of the planets longest known are calculated. The labors, therefore, of Mr. Walker on the elements, and Professor Peirce on the theory of the planet Neptune, have been crowned with complete success. It is proposed hereafter to collect all the observations which may have been made on the planet, and compare them with the ephemeris, in order, if necessary, still further to correct the orbit.

Meteorology.

The general system of meteorology now in operation in this country, and described in the last report, has during the past year been continued and gradually extended. The instruments constructed under the direction of the Institution, with the aid of Professor Guyot, have been further improved, and some slight changes, indicated by experience, have been made to render them more convenient to the practical observer; and they may now be considered not only equal in accuracy to the instruments of the best construction from abroad, but in some respects superior. They are furnished with the means of ready adjustment to the standard instruments; and being in every instance accurately compared before they are used, and the error corrected, the labor of inserting a correction in the journal is avoided. New efforts have also been made to obtain a still more accurate comparison between the standard barometer of this country and those of the more important European observatories. For this purpose a second standard barometer by Newman, compared with the standard of the Royal Society, and a borometer by Ernst, compared with the standard of the Paris Observatory, were ordered at the expense of the Institution. By a long series of comparisons between these two instruments and others at Cambridge, (Massachusetts,) Toronto, (Canada West,) and Washington city, the object sought has, it is believed, been obtained. The thermometers also, constructed by Mr. Green, of New York, for the Institution, have been compared with European standards; and an important step has thus been made towards obtaining reliable results as to the absolute meteorological elements of the different parts of this continent.

It was stated in the last report that the regents of the University of New York had made an appropriation for supplying thirty-three academies in that State with instruments, and had given the establishment of the whole system in charge to this Institution. The State of Massachusetts has also made a similar appropriation and arrangement. During the past year the instruments for this State have been constructed, and a part of the stations established under the care of Professor Guyot.

At the last meeting of the American Association, a report was made, and a series of resolutions adopted, for extending the system of observations with the same instruments to other parts of this continent. These resolutions directed the committee to memorialize Congress for aid in extending the system under the direction of this Institution; to request the Secretary of the Treasury to provide for

making observations at the several light-houses to be established on the coast of California; to ask the Surgeon General to establish new stations at important points; to memorialize the other States of the Union to follow the example of New York and Massachusetts, and also the Canadian government to co-operate in the same enterprise.

What may be the result of the labors of the members of the committee to which this duty is entrusted, it is impossible to say. They can scarcely fail, however, to awaken a more general interest in the enterprise, and to receive a favorable response to some of the requests.

Since the date of the last Report, the system particularly intended to investigate the nature of American storms, immediately under the care of this Institution, has been continued and improved, both in the number of the stations, and, in some degree, in the character of the instruments. An appropriation was made to furnish a larger number of stations than previously with barometers and thermometers, by distributing these instruments, in some cases entirely at the expense of the Institution, and in others by selling them to the observers at half their original cost; but the demand was so great, and the loss by breakage in transmitting the instruments so frequent, that the appropriations were soon exhausted, and until we can afford to devote a large sum to the object, and employ a special agent to transport the articles to their destination, it will be unadvisable to attempt any thing more in this way.

Though the instruments employed by these observers in some cases cannot be relied on for giving absolute results, yet they serve a good purpose in determining changes of pressure and temperature; and the returns give all the varying phases of the sky.

Thus far, the returns which have been received from this system have been arranged in folio volumes; and a beginning has been made in the way of deducing general conclusions from them which may test the value of the observations, and lead to their improvement, by suggesting other objects of inquiry. The results already obtained give promise of interesting and valuable additions to our knowledge of the nature of the storms which traverse this continent during the winter seasons, and will probably serve to settle definitely several theoretical questions of much interest to the meteorologist.

The meteorological correspondence of the Institution is principally attended to by Professor Foreman, and the labor which this involves is sufficient to occupy the greater portion of his time. The letters received from this class of co-operators are not confined to the subject of meteorology, but include the whole domain of physical science. We consider it, as before observed, a duty in all such cases to give any information required; and if this is not in the possession of the officers connected with the Institution, it is procured from other sources.

For the details as to the management of the meteorological affairs of the Institution, see Professor Foreman's report on this subject.

Library and Collections.

It will be recollected that the income of the Institution was, by a compromise alluded to in a former report, to be divided into two equal parts: one part to be devoted to the formation of a museum, a library,

and a gallery of art; and the other to publications, researches, and other active operations. The terms of this compromise have been rigidly adhered to, as will be seen by a reference to the general statement of accounts given in the last report. Up to the date of the appointment of Professor Baird, in July, 1850, the part of the income devoted to the collections was expended on the library, or on objects pertaining to it. Since that time, a portion has been devoted to the museum.

It is proper to remark that this compromise was founded upon another, namely, that the cost of the building and furniture should be limited to two hundred and fifty thousand dollars. But in order to the better security of the collections, the Regents have since found it necessary to add, in round numbers, fifty thousand dollars to this sum, which must of course diminish the income which would otherwise have been devoted to the active operations.

It is evident that one spirit, if possible, should pervade the whole organization, and that the same policy should be adopted with reference to all parts of the plan. Among the maxims which have been acted upon, that of occupying ground untenanted by other institutions, and of doing nothing with the funds which can be equally well accomplished by other means, has commended itself to the intelligent and reflecting portion of the public; and it has always appeared to me that this is as applicable to the formation of collections of books and specimens, as to the publications and other operations of the Institution.

With reference to the library, the idea ought never to be entertained that the portion of the limited income of the Smithsonian fund which can be devoted to the purchase of books will ever be sufficient to meet the wants of the American scholar. On the contrary, it is the duty of this Institution to increase those wants by pointing out new fields for exploration, and by stimulating other researches than those which are now cultivated. It is a part of that duty to make the value of libraries more generally known, and their want in this country more generally felt; to show in what branches of knowledge our libraries are most deficient; to point out the means by which those deficiencies can be supplied; to instruct the public in the best methods of procuring, arranging, cataloguing, and preserving books; to give information as to the best form and construction of library buildings; in short, to do all which was originally intended in the plan, of rendering the Institution a centre of bibliographical knowledge, to which the American scholar can refer for all information relative to books in general, and particularly to those in our own country. The libraries of the country must be supplied by the country itself; by the general government; by the State governments; by cities, towns, and villages; and by wealthy and liberal individuals. It is to be hoped, that in the restoration of the library of Congress, a foundation will be laid for a collection of books worthy of a government whose perpetuity principally depends on the intelligence of the people.

The proper management of books, and general instruction as to their use, are matters perhaps of more importance than their accumulation in any one place. It is estimated that about twenty thousand volumes, including pamphlets, purporting to be additions to the sum of human knowledge, are published annually; and unless this mass be properly

arranged, and the means furnished by which its contents may be ascertained, literature and science will be overwhelmed by their own unwieldy bulk. The pile will begin to totter under its own weight, and all the additions we may heap upon it will tend to add to the extension of the base, without increasing the elevation and dignity of the edifice.

One of the most important means of facilitating the use of libraries, particularly with reference to science, is well digested indexes of subjects, not merely referring to volumes or books, but to memoirs, papers, and parts of scientific transactions and systematic works. As an example of this, I would refer to the admirably arranged and valuable catalogue of books relating to Natural Philosophy and the Mechanical Arts, by Dr. Young. "If my library were on fire," said a celebrated author, "and I could save but one scientific book, it would be Dr. Young's catalogue." This work comes down to 1807; and I know of no richer gift which could be bestowed upon the science of our own day than the continuation of this catalogue to the present time. Every one who is desirous of enlarging the bounds of human knowledge should, in justice to himself, as well as to the public, be acquainted with what has previously been done in the same line, and this he will only be enabled to accomplish by the use of indexes of the kind above mentioned.

The most important operation during the past year relative to the library, is the progress made by Professor Jewett in completing his plan of stereotyping catalogues with separate titles, described in the last Report.

To reduce this plan to practice, a series of original experiments were required, involving the expenditure of much time and labor. For this purpose, in preference to the usual method of stereotyping, a new one, invented by Mr. Josiah Warren, of Indiana, has been adopted on the recommendation of a committee to whom it was referred for examination. It is a fact well known to inventors, that however simple the theoretical plan of effecting a desired object may appear, a series of unforeseen difficulties must often be encountered in the details, before the idea can be realized in actual results. These difficulties, in the present case, it is believed, have been overcome; and the plan is now ready to be applied to the formation of a general and uniform catalogue of the libraries of the country. The course proposed is first to proceed with the catalogue of the library of the Institution, in accordance with the rules recommended by the commission appointed to report on this subject. This, stereotyped by the new process, may be distributed as a model for the other libraries which may adopt the plan. After all parts of the plan have thus been thoroughly tried, it will be desirable to commence on some large collection. The late accident which has happened to the Library of Congress will induce the necessity of a new catalogue, and it is hoped that a liberal and enlightened policy will lead to the adoption of the Smithsonian plan. This will not only enable the government to issue, at a trifling expense, a new catalogue every year, with all the additions in their proper place, but also to assist in giving to the country an improved system of cataloguing, and facilitate the production of a general catalogue of all the libraries of the country.

Since the publication of the account of Mr. Jewett's plan of forming

general catalogues, the invention has been claimed separately by two individuals in Europe. It is true, the want of such a plan has long been felt, and a general idea may have been conceived as to how it might be accomplished; but no attempts have been made to reduce it to practice; and indeed had they been made, they could not have succeeded, and would have done injury to the cause. The conditions necessary to success never before existed, and a premature attempt always tends to lessen public confidence in an enterprise, when the proper time for its actual accomplishment arrives. Besides this, there is a wide difference between the mere suggesting the possibility of a plan, and actually overcoming the difficulties which arise at every step in reducing it to practice.

With reference to the copyright law, something ought to be done to put the whole matter on a better footing. I repeat the assertion before made, that this law, as it now exists, imposes a tax on the Institution, without an adequate return. The great majority of the books received are such as are found in almost every public and private library; with very few exceptions they would never be purchased by the Institution, and are consequently dear at any price, even that of shelf-room and attendance, not to mention cost of transportation and of furnishing the certificates.

Granting the proposition that it is important that a copy of every book originally published in this country should be somewhere preserved, it does not follow that the Smithsonian fund ought to be burdened with the expense of this charge.

If they should be preserved, it becomes the duty of Congress to provide for their care, as much as it does for that of the models of the Patent Office; and no good reason can be assigned why the one should not be imposed upon the Institution as well as the other. Indeed, models are a species of books intended to convey ideas which printing cannot impart.

The objection to the present arrangement may be obviated by adopting the suggestion of Professor Jewett, that but one copy, instead of three, of each book, be sent to Washington for deposit, and that in place of the other two copies, a small fee be paid to the Institution, sufficient to defray all expenses; the maxim again being applied of not expending the funds in doing that which can and ought to be done by other means.

By reference to the report of the Librarian, it will be seen that the collection of books has continued to be increased by purchase, by copyright, and by exchange. From the last-mentioned source the Institution is obtaining a most valuable series of books of the highest interest to the scientific student, consisting principally of the transactions and proceedings of learned societies. In a few years, it is believed, as complete a collection of these will be gathered as it is possible to obtain.

The museum is to consist, according to the law of Congress, and the terms of the compromise, of "objects of art, of foreign and curious research, and of natural history, of plants and geological and mineralogical specimens." It would, however, be unwise in the Institution to attempt the formation of full collections of all these objects, or, in other

words, to form an establishment similar to that of the British Museum. The whole income devoted to this object would be entirely inadequate. The portion of the main building appropriated to the museum consists of a single room, two hundred feet long by fifty feet wide. This space may be entirely filled in the course of three years, without the purchase of a single article, if the means be adopted which present themselves at the seat of government for making collections. But when this space is filled, the accumulation of specimens must cease, or an addition be made to the building, which, to harmonize with the present edifice, would involve a large expenditure. The question then arises, from what source is this money to be obtained? It cannot be derived from the annual income of the capital, for this would cripple the more important operations. It may be said that Congress will furnish the means; but this is relying on a very uncertain source, and the policy of applying to Congress for any aid is doubtful.

Furthermore, a promiscuous collection, embracing full sets of the objects above specified, is unnecessary in carrying out the plan of organization of the Institution.

For example, the organic remains brought from the upper Missouri by Culbertson have been examined and reported on by Dr. Leidy, of Philadelphia, in that city; and the plants from California and Mexico have been referred to Dr. Torrey at Princeton, and to Dr. Gray at Cambridge. In this way, not only has the learning of these gentlemen been brought into requisition, but also their special cabinets rendered subservient to our use. The co-operation of the learning and talent, as well as the use of the libraries and collections of the whole country, is an essential feature of the plan, and ought not to be lost sight of.

I would, however, distinctly disavow the intention of underrating the importance of collections in themselves. On the contrary, it ought to be the duty of the Smithsonian Institution to point out the means by which they may be made, and to aid in the work, to the extent of its ability, by embracing all opportunities which may offer for procuring specimens for distribution, and by facilitating exchange and assisting explorations.

Though the formation of a general collection is neither within the means nor the province of the Institution, it is an object which ought to engage the attention of Congress. A general museum appears to be a necessary establishment at the seat of government of every civilized nation. The navy, the army, and the whole corps of commercial and diplomatic agents in foreign countries, all consider it their duty to send to the seat of government of their own nation every object which may serve to improve or to interest the people. Indeed the government of the United States has already formed the nucleus of such a museum in the collections now in the Patent Office. An establishment of this kind can only be supported by government; and the proposition ought never to be encouraged of putting this duty on the limited, though liberal bequest of a foreigner. The Smithsonian Institution will readily take the supervision of an establishment of this kind, and give plans for its organization and arrangement, provided it be requested to do so, and the means for effecting the object be liberally supplied.

I make these remarks with reference to the collections, because I

am fully impressed with the fact that the tendency of the Institution will be to a statical condition, in which the income will be absorbed in the support and accommodation of objects of a doubtful or contingent value. There is even danger in receiving donations from individuals. The articles may be valuable in part, but may consist also of much which the Institution cannot well afford to keep. Besides this, it is extremely difficult to discharge, acceptably, the duty of the curator of property thus acquired. Since the house-room and the income of the Institution for the accommodation and support of collections are limited, great care must be exercised in the choice of the articles, and preference given to those which are of importance in determining problems of interest, and which give promise of the ready production of new and interesting results.

For a detailed account of the additions to the museum during the past year, and the present state of the collections, I must refer to Professor Baird's report herewith presented.

In an appendix to this will be found a list of the donations, with the names of the donors alphabetically arranged. These consist principally of specimens not generally found in other collections; and though they may not be very attractive to ordinary visitors, the student of natural history will find in them much of interest.

The circular prepared by Professor Baird, describing the method of collecting and preparing specimens, and indicating objects especially desirable, has proved effective in procuring important contributions.

Among the objects which should be collected and preserved with care, are the remains of the specimens of the arts of the aboriginal inhabitants of this country, the contents of mounds, and the stone implements found on the surface of the earth. The implements and industrial products of the present tribes of Indians should also be gathered as the materials for the advance of the new and interesting science of ethnology. Of the contents of mounds, but a limited amount of specimens exist; and as these are not, like the spontaneous productions of nature, constantly in the process of reproduction, every article should be diligently sought for, and carefully preserved. Some additions have been made to the collections in this line.

The museum of natural history, besides plants and minerals, numbers eighteen hundred and fifty jars, containing specimens in spirits of mammalia, reptiles, fishes, articulata, mollusca, and radiata, amounting in all to twenty-five hundred species. Besides these, there are about nine hundred specimens of skulls and skeletons, and three thousand of skins of European and American birds.

Lectures.

In accordance with the suggestion contained in the act of incorporation of the Institution, courses of lectures have been given during the past year in the lecture-room of the Smithsonian building, and the reports of these lectures are generally copied in the public papers throughout the Union. Though the plan of diffusing knowledge by means of lectures is too restricted in its influence to meet fully the liberal views of the Smithsonian bequest, yet there is no place in the

United States where such means will have a tendency to affect more minds and do more good than in the city of Washington. Persons from all parts of the country assemble here during the sessions of Congress. It was supposed, at first, that the interest in these lectures would soon die away; but the experience of three years has indicated no tendency of this kind. This is in part owing to the constant influx of strangers and change of inhabitants. Besides this, there is in this city, in proportion to the whole number of inhabitants, a large number of intelligent persons, with moderate salaries, who gladly avail themselves of the means of improvement offered by the gratuitous lectures of the Institution.

As an evidence of the high appreciation of the advantages which these lectures afford the citizens of Washington, I may mention that the corporation of the city has ordered, since the last meeting of the Board, a bridge to be constructed over the canal at Tenth street, for the special accommodation of those who attend the evening instruction given at the Institution. This bridge, with a well-drained and well-lighted path across the public grounds, will afford a direct and comfortable approach to the building from a central point on Pennsylvania avenue.

In my last report I mentioned the fact that much complaint had been made through the public papers on account of the size of the lecture-room. It was the original intention of the Regents to construct a lecture-room in the main building, though, according to the plan proposed, the number of persons it would hold would scarcely have been greater than that now accommodated. This plan, however, was thought to be unsafe, because it was not proposed to make the interior fire-proof; but since an opposite course has been resolved upon, a large lecture-room may with safety be constructed in the main building, and the present lecture-room, having temporarily served the purpose, may be applied to other uses.

The proper construction of a lecture-room is, however, a problem of great difficulty, which in the present instance will be much enhanced by the form and peculiarities of the building. It must be well adapted to sight, to sound, to ventilation, and warming. A room might be constructed which would seat five thousand persons; but we know of none such, in every part of which an ordinary speaker can be distinctly heard. Too much must, therefore, not be expected with reference to the new lecture-room, though every endeavor will be made to render it as perfect as the conditions to which it is unavoidably subjected will allow.

The selection of the lecturers, and the arrangement of the courses, have been found, in some cases, an unpleasant and perplexing duty. The gentlemen invited, as a general rule, have been men of high standing, and have been chosen on account of their reputation and moral worth, rather than with reference to their proficiency in the art of rhetoric. It is not the aim of the Institution in these lectures merely to please the ear, but to impart important truths which may be valued for their own sake.

Many applications have been made for the use of the lecture-room of the Institution for pay lectures and exhibitions of a private character;

but these have in all cases been refused. The use of the room has, however, on several occasions been given to the faculty of Columbian College, and also for the meetings of the Teachers' Association of the District of Columbia. The organization of this association took place in the Smithsonian building in 1850, and its meetings have been regularly held in the lecture-room from that time to the present. It is believed that the spirit of the will of Smithson is properly consulted in giving encouragement and rendering facilities to these meetings. The association has been kept up with much spirit, and I am sure that much good has resulted from the organization. It has served to cherish a feeling of harmony among the teachers, and to awaken a spirit of improvement relative to education and general knowledge.

The following is a list of the titles of lectures given before the Institution during the last session of Congress, with the names of the gentlemen by whom they were delivered:

A course of six lectures on History as a science, and a single one on Poetry, by Dr. Samuel H. Cox, of Brooklyn, New York.

Two lectures on Induction and Association, by Dr. John Ludlow, Provost of the University of Pennsylvania.

A course of five lectures on Entomology, and one on the Alps, by Rev. Dr. John G. Morris, of Baltimore, Maryland.

Two lectures on the History and the Forms of the English Language, by Professor W. C. Fowler, of Amherst, Massachusetts.

One lecture on the Architecture of the Middle Ages, by Dr. A. H. Vinton, of Boston.

Two lectures by Professor S. S. Haldeman, of Columbia, Pennsylvania, on the Mechanism of Speech, and its bearing upon the natural history of the human race.

Two lectures on Geology, by Dr. Benjamin Silliman, sr., of Yale College, New Haven.

JOSEPH HENRY,
Secretary of the Smithsonian Institution.

SIXTH ANNUAL REPORT

Of the Secretary of the Smithsonian Institution, for the year 1852.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: The object of the Annual Report of the Secretary is not only to present to the Regents an account of the transactions of the period which elapses between their successive sessions, but also to make such suggestions as may be important to the future management of the affairs of the Institution, and to state such facts in reference to it as may be interesting to the public, or which may furnish a connected history of its transactions.

Since the beginning of the Institution no change has taken place in the policy originally adopted with reference to the system of active operations. The details of this plan were well considered, and its importance as the only means of properly carrying out the intention of the donor was fully understood at the first. The theory of the plan was expressed in a few propositions, which have been constantly kept in view, and acted upon as far as the law of Congress and other restrictions would permit.

This plan, although prosecuted under very unfavorable circumstances, has produced results such as to render the name of the Institution favorably known wherever science and literature are cultivated, and to connect it indissolubly with the history of the progress of knowledge in our times. As proof of this we need only state the following facts:

The Institution has promoted astronomy, by the aid furnished the researches which led to the discovery of the true orbit of the new planet Neptune, and the determination of the perturbations of this planet and the other bodies of the solar system, on account of their mutual attraction. It has also aided the same branch of science by furnishing instruments and other facilities to the Chilian expedition, under Lieut. Gilliss; and by preparing and publishing an ephemeris of Neptune, which has been adopted by all the astronomers of the world.

It has advanced geography, by providing the scientific traveller with annual lists of the occultations of the principal stars; by the moon, for the determination of longitude; by the preparation of tables for ascertaining heights with the barometer; and by the collection and publication of important facts relative to the topography of different parts of the country, particularly of the valley of the Mississippi.

It has established an extended system of meteorological investigation, consisting of several hundred intelligent observers, who are daily noting the phases of the weather in every part of the continent of North America. It has imported standard instruments, constructed hundreds of compared thermometers, barometers, and psychrometers, and has furnished improved tables and directions for observing with these instruments the various changes of the atmosphere, as to temperature, pressure, moisture, &c. It has collected, and is collecting, from its

observers, an extended series of facts, which are yielding deductions of great interest in regard to the climate of this country and the meteorology of the globe.

The Institution has advanced the science of geology, by its researches and original publications. It has made a preliminary exploration of the remarkable region on the upper Missouri river called the "Bad Lands," and is now printing a descriptive memoir on the extraordinary fossil remains which abound in that locality. It has assisted in explorations relative to the distribution in this country of the remains of microscopic animals found in immense quantities in different parts of the United States.

It has made important contributions to botany, by means of the published results of explorations in Texas, New Mexico, and California, and by the preparation and publication of an extended memoir, illustrated with colored engravings, on the sea-plants of the coast of North America.

It has published several important original papers on physiology, comparative anatomy, zoology, and different branches of descriptive natural history; and has prepared and printed, for distribution to travellers, a series of Directions for collecting and preserving specimens.

It has advanced the science of terrestrial magnetism, by furnishing instruments for determining the elements of the magnetic force, to various exploring expeditions; and by publishing the results of observations made under its direction, at the expense of the government.

It has collected and published the statistics of the libraries of the United States, and perfected a plan of stereotyping catalogues, which will render effective, as a combined whole, all the scattered libraries of the country.

The Institution has been instrumental in directing attention to American antiquities, and has awakened such an interest in the subject as will tend to the collection and study of all the facts which can be gathered relative to the ancient inhabitants of this continent. It has also rendered available for the purposes of the ethnologist and philanthropist the labors of our missionaries among the Dakotas, by publishing a volume on the language of this tribe of Indians; and has done good service to comparative philology by the distribution of directions for collecting Indian vocabularies.

It has established an extended system of literary and scientific exchanges, both foreign and domestic, and annually transmits between the most distant societies and individuals, hundreds of packages of valuable works. It has presented its own publications, free of expense, to all the first-class libraries of the world, and thus rendered them accessible, as far as possible, to all persons who are interested in their study. No restriction of copyright has been placed on their republication; and the truths which they contain are daily finding their way to the general public, through the labors of popular writers and teachers. The distribution of its publications and its system of exchanges have served not only to advance and diffuse knowledge, but also to increase the reputation, and, consequently, the influence of our country; to promote a kindly and sympathetic feeling between the New World and Old—alike grateful to the philosopher and the philanthropist.

These are the fruits of what is called the system of active operations of the Institution, and its power to produce other and continuous results is only limited by the amount of the income which can be appropriated to it, since each succeeding year has presented new and important fields for its cultivation. All the anticipations indulged with regard to it have been fully realized; and, after an experience of six years, there can now be no doubt of the true policy of the Regents in regard to it.

I am well aware, however, that the idea is entertained by some that the system of active operations, though at present in a flourishing condition, cannot continue to be the prominent object of attention; and that under another set of directors, other counsels will prevail and other measures be adopted, and that what has been done in establishing this system will ultimately be undone. It is true, there is cause of fear that the policy in this respect may be changed; for the system we are here considering requires constant exertion, and is little suited to the tastes and habits of those who seek place and position from mere personal considerations. There is cause to fear, also, from the experience of the past, that the general expenses of a large building, the support of the establishment necessarily connected with it, and the cost of collecting, preserving, and exhibiting specimens of nature and art, will so increase as to paralyze the spirit of activity. Furthermore, the proposition is frequently urged upon the Regents, by persons who have not duly considered the will of Smithson, or who fail to appreciate the importance of the present plan, that a large portion of the income should be devoted to the diffusion of a knowledge of some popular branch of practical art; and there may be some fear that a timid policy on the part of the friends of the Institution will lead them to favor such a plan.

To obviate these tendencies, it is the duty of the present Regents, if they are convinced that the policy of active operations is the true one, to endeavor to correct, as far as possible, the errors which may have been committed in the beginning, and to give the Institution such an impulse in the proper direction, that it cannot deviate from it without immediately arresting the attention of the enlightened public, both at home and abroad, who will not fail to demand, authoritatively, a sufficient reason for the change.

A promise has been made to all persons in this country, engaged in original researches, and who are capable of furnishing additions to the sum of human knowledge, that the result of their labors shall continue to be presented to the world through the Smithsonian publications. The honor of the Institution is also pledged to the scientific and literary societies from which it has received exchanges, in this and other countries, that it will continue to send to them at least an annual volume of Contributions, of a character similar to those with which they have already been presented. It is on this condition that the library has been so richly favored, not only with the current volumes of Transactions, but also, in many cases from the oldest societies, with full sets of all the previous volumes of their series of publications. Besides this, the libraries of all the colleges and literary and philosophical societies of this country are supplied with full sets of the Smithsonian Transactions;

and in this way a foretaste has been given of the fruit of the operations which will tend, in some degree, to insure their continuance.

But if, notwithstanding all this, the Institution is destined to a change of policy, what has been well done in the line we are advocating can never be undone. The new truths developed by the researches originated by the Institution, and recorded in its publications; the effect of its exchanges with foreign countries; and the results of the cataloguing system, can never be obliterated; they will endure through all coming time. Should the government of the United States be dissolved, and the Smithsonian fund dissipated to the winds, the "Smithsonian Contributions to Knowledge" will still be found in the principal libraries of the world, a perpetual monument of the wisdom and liberality of the founder of the Institution, and of the faithfulness of those who first directed its affairs.

Whatever, therefore, may be the future condition of the Institution, the true policy, for the present, is to devote its energies to the system of active operations. All other objects should be subordinate to this, and be in no wise suffered to diminish the good which it is capable of producing. It should be prosecuted with discretion, but with vigor; the results will be its vindication.

It was stated in the last Report that the Institution had been the contingent legatee of a considerable amount of property. During the past year the facts with reference to this bequest have been investigated, and it appears that Mr. Wynn, of Brooklyn, N. Y., deceased, left a legacy to his wife, and the greater part of his property, valued at $75,000, to his daughter, a child six years old, with the condition that at the death of this daughter without issue, the property should come to the Smithsonian Institution. In making this bequest Mr. Wynn says, in his will: "I know no benevolent institution more useful and appropriate than the Smithsonian Institution at Washington."

This circumstance is highly gratifying to the friends of the Institution, not because it offers a remote possibility of an increase of the funds, but on account of the evidence it affords of the liberal views of the deceased, and of his confidence in the proper management and importance of the Smithsonian bequest. The will of Mr. Wynn induces us to believe that the right administration of the Smithsonian fund will cause similar examples of liberality on the part of wealthy individuals of our country; and in this point of view the responsibility which rests on those who have the direction of the affairs of this Institution is greater than that with reference to the good which the income itself may immediately accomplish.

Though it is scarcely to be expected that many unconditional bequests will be made, yet the example of Smithson may induce the founding of other institutions which may serve to perpetuate other names, and increase the blessings which may flow from such judicious liberality. Man is a sympathetic being; and it is not impossible that Smithson himself may have caught the first idea of his benevolent design from the example of our countryman, Count Rumford, the principal founder of the Royal Institution of London.

Bequests for special purposes, bearing the names of the testators, are not incongruous with the plan of this Institution. Lectureships on

particular subjects, annual reports on special branches of knowledge, provision for certain lines of research, and libraries for general use or special reference, may be founded under the name of those who bestow the funds, and be placed under the direction of, and incorporated with, the Smithsonian Institution. The charge, however, of such bequests ought not to be accepted unless they are sufficient in themselves to meet the expenses of the object contemplated by them, and would not incumber or impede the legitimate operations of the Institution. For example: were a library of a hundred thousand volumes offered, it would be unwise to accept it were it not accompanied by the funds necessary to the erection of a building and to the proper support of the collection.

In July, 1850, a new system of accounts was introduced, which has been continued to the present time. According to this system, every payment is made by an order of the Secretary on the Treasurer, who, in turn, gives his check on Messrs. Corcoran & Riggs, with whom the semi-annual interest and the other income of the Institution are deposited. As often as once a quarter all the bills are examined and referred to their appropriate classes, in presence of all the officers of the Institution. After the accounts are posted, they are referred to the Executive Committee for final examination.

By a reference to the report of the Executive Committee, it will be seen that the funds are in a good condition, and that, although during the past year $14,047 has been paid on the building, there is still on hand, after all the expenditures for publications and other purposes, besides the original bequest, upwards of $200,000 of accrued interest. It is to be regretted that Congress has not yet acted on the petition requesting the perpetual funding of $150,000 of the last-mentioned sum. It is highly important that this money should be permanently invested as a part of the principal, so that it can neither be lost nor expended. There are no other means of effectually accomplishing this result, except by funding it in the Treasury of the United States. The proposition should be pressed upon Congress, though there may be, at present, no very certain prospect of success; for, if the petition be refused, and the money be afterwards lost by improper investment or injudicious expenditure, the responsibility would, in part, rest with the government.

The charge of this fund, and of all the disbursements, is attended with much solicitude. It involves a degree of responsibility which, to a person unaccustomed to large financial transactions, is very onerous. I beg leave, however, in this place to mention the obligation which the Institution is under to W. W. Corcoran, esq., for the aid which he has, in all cases, afforded in the management of the funds, and the judicious advice which he has always given relative to their investment.

From the report of the Building Committee it appears that the contract for finishing the interior of the wings and ranges, and the rooms of the towers, has been completed. The whole interior of the main building, comprising a rectangular space of two hundred feet long, fifty wide, and about sixty high, remains to be finished with fire-proof materials. It is proposed to divide this space into two stories and a

basement; these stories to be devoted to the library, the museum, and a large and convenient lecture-room.

The business of the Institution would be much facilitated were this part of the building completed. Since Congress has authorized the establishment of a library and museum, it will be well to place all the objects of interest to the public in the main building, and make this exclusively the show part of the establishment, devoting the wings and ranges, and rooms of the towers, to the business operations and other purposes of the Institution. In the present condition of affairs there is no part of the edifice to which the public has not access, and, consequently, business has to be transacted amidst constant interruptions. The loss of time and effective life to which all are exposed who occupy a position of notoriety in the city of Washington, is truly lamentable; and where this is increased by facility of access to gratify mere curiosity, the evil becomes scarcely endurable. Progress in business, under such circumstances, can only be made by an encroachment on the hours usually allotted to rest, and that, too, at the expense of wasted energies and shortened days.

Publications.

During the past year the following memoirs, described in the previous Reports, have been collected into volumes and distributed to public institutions in this country and abroad:

1. Observations on Terrestrial Magnetism.
2. Researches on Electrical Rheometry.
3. Contributions to the Natural History of the Fresh-water Fishes of North America.
4. First part of the Marine Algæ of the coast of the United States.
5. Plantæ Wrightianæ Texano-Neo-Mexicanæ, Part I.
6. Law of Deposite of the Flood Tide, its dynamical action and office.
7. Description of Ancient Works in Ohio.
8. Occultations visible in the United States during the year 1852.
9. A Grammar and Dictionary of the Dakota language.

The memoir last mentioned occupies an entire volume, the fourth of the Smithsonian series of Contributions. The other memoirs are contained in the third volume of the same series.

The remaining memoirs, described in the last Report, are still in the press, the printing of them having been delayed by the exhaustion of the appropriation for the year, and by several necessary corrections. A sufficient number of papers will, however, be printed in the course of a few months, with the new appropriation, to complete the fifth volume of Contributions; and if the means prove sufficient, we can readily issue the sixth volume during the present year.

The result of the plan of publication has fully realized the anticipations which were entertained of its usefulness. It supplies the food it feeds upon. The appearance in the Contributions of a memoir on any subject immediately directs attention to that subject, and induces other laborers to engage in the same field of exploration. This is particularly manifest in the interest awakened with regard to the antiqui-

ties of our country, and to the language of the Indian tribes, by the publications of the Institution on these subjects.

The following is an account of the memoirs received since the date of the last Report:

1. Contributions to the History of the Marine Algæ of North America: By Dr. W. H. Harvey: Part II.

In the Report for 1850, an account was given of the acceptance for publication of an extended and expensive memoir of the Marine Algæ of the eastern and southern coasts of the United States, by Professor Harvey, of the University of Dublin. The first part of this memoir was published last spring, and has found much favor with the botanical world, as well as with the inhabitants and visitors of our sea-board. The second part of the same memoir is now printed, and will be ready for distribution in the course of a few weeks. It is illustrated by twenty-four plates, and comprises 240 pages of printed matter.

The common name of the class of plants which forms the subject of this memoir, viz: sea-weeds, has subjected the Institution to the charge of expending its funds on trifling and unworthy objects; and as the same objection may be made to many of the papers forming the series of Smithsonian Contributions, a few words in vindication of researches of this character may not be inappropriate.

Nothing in the whole system of nature is isolated or unimportant. The fall of a leaf and the motion of a planet are governed by the same laws. The structure of a lichen and the formation of an oak are equally the result of definite plans. It is in the study of objects, considered trivial and unworthy of notice by the casual observer, that genius finds the most important and interesting phenomena. It was in the investigation of the varying colors of the soap-bubble that Newton detected the remarkable fact of the fits of easy reflection and easy refraction presented by a ray of light in its passage through space, and upon which he established the fundamental principle of the present generalization of the undulatory theory of light. Smithson himself, the founder of this Institution, considered the analysis of a tear as nowise unworthy of his peculiar chemical skill; and well might he so consider it; for the knowledge of the composition of every secretion of the body is of importance, in a physiological point of view, as well as in the preservation of health and the cure of disease. The study of the cause of the spasmodic muscular contraction of a frog, when brought into contact with two pieces of metal, revealed to Galvani the first facts of the branch of science which now bears his name. The microscopic organization of animals and plants is replete with the highest instruction; and, surely, in the language of one of the fathers of modern physical science, "nothing can be unworthy of being investigated by man which was thought worthy of being created by God."

These remarks are particularly applicable to the study of the lower classes of the organic creation. Nature everywhere exhibits economy of means in attaining the most complex and diversified ends. Every result is produced in the simplest manner when viewed in relation to the whole design. All parts of organized beings, whether plants or animals, are formed of a few elementary structures, variously trans-

formed and combined. To obtain a knowledge of the plan and process of organization, we must begin with the most simple combinations, precisely as we would do in the study of mathematical analyses, in which the student commences with the least complicated formulæ, and gradually proceeds to those of a more involved character. It is for this reason that the study of the algæ, or sea-weeds, is of special interest to the physiologist. The framework of every vegetable is built up of cells or little membranous sacks. All vegetable structures, whether wood, bark, or leaves, are formed of aggregations of these cells, differently moulded and united. As we pass along the series of organized forms, we may descend from those of a higher to those of a lower complexity, until, in the class of algæ, we arrive at plants of which the whole body is composed of a few cells strung together; and finally at others, the simplest of organized bodies, whose entire framework is a single cell. Now, it is only by a critical study of these rudimentary forms, and by tracing them into their complex combinations, that man can ever hope to arrive at a knowledge of the laws of organization. We might speak of the importance of a knowledge of the algæ in their application to agriculture and the chemical arts; but what we have here stated will be a sufficient reason for their study, independent of all minor considerations.

2. The next memoir consists of an account of a series of researches in the comparative anatomy of the frog, by Dr. Jeffries Wyman, of Cambridge, Massachusetts.

The whole animal kingdom may in one sense be considered as the different development of four separate plans of organization, giving rise to four different classes of animals, viz: the Radiata, the Articulata, Mollusca, and Vertebrata. Whatever discovery is made with regard to the organization of any of the species belonging to any one of these classes, tends to throw light on the organization of the whole class; and it is only by the careful study of all the different animals of a class, and a comparison of their analogous parts, that we can arrive at a knowledge of the general laws which control the development of the whole. Thus the study of human anatomy is the basis of the investigation of the anatomy of all animals with a back-bone; and conversely, the anatomy of any animal of this class tends to throw light on that of man.

Dr. Wyman's paper gives an account of a series of elaborate investigations of the nervous system of a very common, but, in a physiological point of view, highly interesting animal.

The following are the several points of the memoir:

(1.) An anatomical description of the more important parts of the nervous system.

(2.) Comparisons between them and the corresponding organs of other animals, both higher and lower in the scale.

(3.) The metamorphoses which they undergo, especially the spinal chord and some of the cranial nerves, showing the existence of a more complete analogy between the immature condition of Batrachian reptiles and the class of fishes, than has hitherto been noticed.

(4.) An application of the facts observed in connexion with the cranial nerves to the philosophical anatomy of the nervous system, showing

what is believed to be the true nature of the special sense nerves, as contrasted with other cranial or the true spinal nerves, and the conformity of the other cranial nerves to the common spinal type.

3. The next communication has the following title: "Plantæ Wrightianæ Texano-Neo-Mexicanæ, Part II: By Dr. Asa Gray, Professor of Botany in Harvard University."

It has been stated in two of the preceding reports that a small appropriation was made for botanical explorations in Texas and New Mexico, and that the results had been placed in the hands of Dr. Gray for scientific investigation. The first memoir on this subject was described in the last report. It has been printed, and copies distributed to all the working botanists in this country and Europe. It also forms a part of the third volume of the "Smithsonian Contributions."

The object of the present memoir is to give a scientific account of the collections made by Mr. Wright, under the direction of Col. J. D. Graham, U. S. Topographical Engineers, and Major W. H. Emory, of the Boundary Commission, in New Mexico and in Eastern Texas, during the summer and autum of 1851, and the spring and early part of the summer of 1852.

The description of the plants from this region was previously carried as far as the order *Compositæ*. In the present paper Dr. Gray gives a similar account of the recent collections up to the same point, and reserves the other portions of these collections made by Mr. Wright, with the remainder of the undescribed plants of Fendler and Lindheimer, to be described in a general memoir. One portion of the collection was made from July to November, from El Paso to the Copper Mines of Santa Rita del Cobre, in the southwestern part of New Mexico; and thence into the northern part of the Mexican State of Sonora, as far as Santa Cruz, returning to the Copper Mines by way of Guadalupe Pass, and thence back to El Paso. The plants obtained during this tour are of exceeding interest, and comprise a larger portion of new species than any other collection that has fallen into Dr. Gray's hands. Another portion was obtained in the vicinity of El Paso and the rancho of Frontera, and down the Rio Grande for sixty or seventy miles; also, up the valley of the river as far as Camp Fillmore, and thence into the Organ mountains, which bound the valley on the east. Another collection was made in a hasty excursion to Lake St. Marie and Lake Guztman, in Chihuahua. These several collections afford many novelties, no botanist having previously explored this region at the same season of the year.

It is expected that a full account of the topography and productions of this country will be given in the reports of Colonel Graham and Major Emory.

The interest which attaches to the results of explorations of this kind is not confined to the botanist, but extends to the physical geographer and the political economist. An accurate description of the botany of a region is a sure guide to a knowledge of its power of producing and sustaining vegetable and animal life, and consequently of its value in a commercial and political point of view.

4. Dr. Leidy, of Philadelphia, has presented a memoir on the extinct species of the ox of America. In this paper he indicates the former

existence of four species of the ox, which were probably contemporaneous with the *Mastodon* and the *Megalonyx*. Fossil remains of these animals have been frequently found in the United States, and descriptions of them are scattered through various works; but no approach has before been made to a correct view of the number and character of the species. The present existing species of ox are found indigenous in every part of the world except South America and Australia; and this is the more remarkable, because the domestic ox introduced into the former country by Europeans exists in immense herds on the pampas in a wild state. There is a similar fact with regard to the horse. America, at the period of its discovery, possessed no indigenous quadruped of this kind, though the climate is highly favorable to its existence, and the remains of two extinct species are frequently found. Two of the species of ox described by Dr. Leidy belong to the genus Bison, and one of these is of gigantic size. The other two species belong to a new genus called *Bootherium*.

5. Another memoir presented by the same author forms an interesting addition to our knowledge of the extinct gigantic sloth tribe of North America. It comprises a description of remains of the *Megalonyx*, *Mylodon*, *Megatherium*, and of a new genus called *Eriptodon*.

The scientific world is indebted for the first account of the remains of a large extinct quadruped of the sloth tribe to President Jefferson. Fragments of the bones of this animal were found in a saltpetre cave in Greenbrier county, Virginia. They were regarded with little or no interest by the persons who first observed them, and, as they encumbered the saltpetre bed, would probably have been thrown out and suffered to decay, had not the news of their existence reached the ears of the distinguished individual before mentioned. Though devoted to politics, he was too much of a philosopher not to see in these mouldering fragments of a skeleton objects of high interest connected with the past history of our globe. He described them in a memoir published in the Transactions of the American Philosophical Society at Philadelphia in 1797, and gave to the animal to which they belong the name of *Megalonyx*, or the great claw. The materials in his possession, however, were too scanty to allow of his determining the true character of the quadruped. Dr. Wistar, of Philadelphia, suspected the animal to have been a gigantic sloth; and this opinion was confirmed by Cuvier, from the ample materials for comparison at his command. The original bones described by Jefferson are preserved in the collection of the Philosophical Society; but, besides these, Dr. Leidy had access to specimens of the remains of the same animal, found in different parts of the United States. From the study of these he has been enabled to throw much additional light upon the characters of the *Megalonyx*. He considers that the only remains of this animal yet known are those found in the United States, and satisfactorily proves that the lower jaw of an extinct quadruped discovered by Dr. Darwin in South America, and referred by naturalists to the *Megalonyx* of Jefferson, does not belong to an animal of the same genus.

The remains of the *Mylodon*, or gigantic sloth, were first discovered by Darwin in his researches in the southern part of South America. Remains of another species found in North America were described

by Dr. Harlan, but were erroneously referred to the *Megalonyx*. Dr. Leidy, in his memoir, describes the collection of the remains of this animal belonging to the New York Lyceum.

The *Megatherium*, which is the largest of all the extinct sloth tribe, when full grown, was more than fourteen feet long, including the tail, and eight feet high. It was first discovered in South America, but has since been found in Georgia; and it was from this locality, the only one in the United States yet known, that the remains described by Dr. Leidy were obtained..

The fourth and new genus of American sloths, called the *Eriptodon* by the author, is established upon a peculiar form of teeth which belonged to an animal of about the size of the *Megalonyx*, the bones of which were also found in Georgia.

Dr. Hays, one of the commission to which this memoir was submitted, remarks in his report, that "the author has not only made valuable additions to our knowledge of an interesting tribe of animals, but has also collected and arranged the facts previously known so as to throw new light on the subject, and to render his memoir an important starting point for future investigators."

Grammar of the Choctaw language.

The publication of the volume on the Dakota language described in the last Report, has called forth another important memoir on comparative philology, namely, a Grammar of the Choctaw language, by the Rev. Harvey Byington, for thirty years a missionary among the Indians.

It was referred for examination to Professor Felton, of Cambridge, and to Professor Gibbs, of Yale College, both of whom pronounced it an important addition to ethnology, and warmly recommended its publication. The work was afterwards placed in the hands of Professor W. W. Turner, formerly professor of Hebrew in the New York Theological Seminary, now librarian of the United States Patent Office. Previous to sending it to the press, the author, after numerous interviews with Professor Turner, concluded that this memoir was susceptible of so much improvement by a further study of the language, that he asked leave to withdraw it for a time. This request was of course granted, and Mr. Byington has returned to his missionary labors, and will again present the work after it has received the desired improvements.

Reports and other minor publications.

Since the date of the last Report to the Regents, the following articles have been printed and partially distributed:

1. Directions for making Collections in Natural History. This is a pamphlet of twenty-four pages, by Professor Baird, and is much called for by the correspondents of the Institution.

2. A work by Professor Jewett, containing an exposition of the system adopted by the Smithsonian Institution for constructing catalogues of libraries, by means of separate stereotype titles, with rules for the

guidance of librarians, and examples for illustration. This work is comprised in seventy-eight pages, and though not large, it has been produced at the expense of much time and labor.

3. A second emission of the Report on the Recent Improvements in the Chemical Arts has been printed and in part distributed. This work is stereotyped, and therefore copies can be supplied at any time, at a comparatively small cost.

4. A description of the Portraits of the North American Indians in the gallery of the Smithsonian Institution, by the painter of the portraits, J. M. Stanley, esq. This is a pamphlet of seventy-six pages, and contains brief sketches of the characters and incidents in the history of forty-three different tribes of Indians.

5. The first part of the collection of tables to facilitate meteorological and other calculations, by Professor Guyot: this was mentioned in the last Report, and has been stereotyped and distributed. It is a very acceptable present to the meteorological observers of the Institution, and other persons engaged in scientific investigations.

Several reports on different subjects are in progress of preparation; but the appropriation for this part of the programme of operations is at present so small, that the completion of them has not been urged upon the authors. The first part of the report on forest trees, by Dr. Gray, of Cambridge, will be ready for the press the latter part of the present or beginning of the next year.

Distribution of publications and exchanges.

Copies of the Smithsonian Contributions to Knowledge are sent to all the first-class libraries and literary and scientific societies of the world, and in return the Institution receives an equivalent in Transactions and other publications. After the printing of the first volume of Contributions was completed, a copy of it and of the programme of organization were sent to the principal foreign literary and scientific institutions, with the request that they would exchange publications, on the condition that a volume of equal importance should be presented to them annually. At first the number of responses to this proposition was small; but since the character of the Institution has become known and appreciated, the works received in exchange have rapidly increased in number and importance. The whole number of articles received during 1852 is four thousand seven hundred and forty-four, which is more than three times that of all the previous years. The publications received in many cases consist of entire sets of Transactions, the earlier volumes of which are out of print, and cannot be purchased. They are of use in carrying on the various investigations of the Institution, and of value to the country as works of reference. They ought not to be considered as donations to the library, but as the products of the active operations, which the Institution is at liberty to dispose of in the manner best suited to further its designs. The principal object, however, of the distribution of the Smithsonian volumes, is not to procure a large library in exchange, but to diffuse among men a knowledge of the new truths discovered by the agency of the Smithsonian fund. The worth and importance of the Institution is not to be estimated by what it accu-

mulates within the walls of its building, but by what it sends forth to the world. Its great mission is to facilitate the use of all the implements of research, and to diffuse the knowledge which this use may develop. The Smithsonian publications are sent to some institutions abroad, and to the great majority of those at home, without any return except, in some cases, that of co-operation in meteorological and other observations. Applications for these publications have now become so numerous, that the edition printed will supply but a part of the demand, and it becomes a difficult matter to select the places which will best subserve the purpose of rendering them accessible to the greatest number of persons who would be benefited by their perusal.

In connexion with the distribution of its own publications, the Institution has adopted an arrangement to establish and promote a more general exchange of literary and scientific productions between this and other countries. For this purpose it receives packages from societies and individuals in the different parts of the United States, and transmits them to England or the continent, and through its agents distributes them to the parties for whom they are intended. It also receives the articles sent in return, and forwards them to those to whom they are addressed. To facilitate this operation, the packages to the Institution are addressed to the collector of customs in New York, and by him, on the certificate of the secretary, admitted free of duty, and without the delay of an examination.

In carrying out this plan, the Institution is much indebted to the liberal course adopted by the government of Great Britain, and to the ready co-operation of the Royal Society of London. All packages intended for Great Britain, for some parts of the continent, and the East Indies, are directed to the care of the Royal Society, and on the certificate of its president, are, by a special order of the government, admitted duty free, and without the delay and risk of inspection. The packages are afterwards distributed by the agent of the Institution, or by those of the Society.

This system of exchange does not stop here. The Royal Society has adopted the same plan with reference to Great Britain and all other parts of the world; and the Smithsonian Institution, in turn, becomes an agent in receiving and distributing all packages which the Society desires to send to this country. A general system of international communication, first started by this Institution for the distribution of its own publications, has thus been established, which will tend to render the results of the labors of each country in the line of literature and science common to all, and to produce a community of interest and of relations of the highest importance to the advancement of knowledge, and of kindly feeling "among men."

The results of the operations of the system of foreign exchanges during the year 1852 are exceedingly gratifying. The whole number of packages sent out, including the Smithsonian publications, is 572, containing 9,195 articles, and weighing 9,855 pounds. There have been received, in addition to the 4,745 articles for this Institution, 637 packages, containing an unknown number of volumes, for other institutions in this country. The details of the business of the exchanges are entrusted to Professor Baird; and I would refer, for a particular

statement of all the facts connected with it, to his report, herewith submitted.

The planet Neptune.

It has been mentioned in the last annual reports that Mr. S. C. Walker, of the U. S. Coast Survey, prepared, at the expense of the Smithsonian Institution, a memoir containing an exposition of the elements of the true orbit of the planet Neptune, and that from this orbit, and the mathematical investigation of Professor Pierce, of Cambridge, an ephemeris of Neptune had been deduced, which has been accepted by all the astronomers of the world as the only certain guide to the position of the planet. This ephemeris was prepared for 1848 and 1849, at the expense of the Institution; but since the last-mentioned date it has been calculated at the expense of the appropriation for the Nautical Almanac, while the cost of printing and distribution has been defrayed by the Institution. The same arrangement will continue for the ephemeris of 1853 and 1854, after which the whole will be transferred to the Nautical Almanac.

Occultations.

The moon, in her passage eastward around the earth, continually passes between us and the fixed stars or planets which lie in her path, and obscures them from our view. The instant of the disappearance of a star behind the moon, or the occultation of a star, as the phenomenon is called, can be noted by observers widely separated from each other, and hence this phenomenon becomes a ready means of determining the difference of longitude between two places. The employment of occultations for fixing geographical positions is easy, and leads to accuracy in the results. The telescope may be of moderate size, and requires no accurate adjustment; the position assigned it may be such as to suit the convenience of the observer. The frequent occurrence of occultations renders the use of them of great importance to the travelling observer; and the publication of lists of these, and of tables for their reduction, is essential to the improvement of geography. They are of particular value in this country, on account of the frequent exploring and surveying expeditions now carried on by our government and our people, and to be continued for an indefinite time in the extensive territory of the West, and the newly-acquired possessions of the Southwest. Tables of occultations for 1849 and 1850 were prepared and published at the expense of this Institution; but for subsequent years the expense of their preparation has been defrayed by the appropriation for the Nautical Almanac, under the direction of Lieutenant Davis, while the composition and press-work are still at the expense of the Institution. As soon as the Nautical Almanac is fully commenced, the publication of these tables will be entirely relinquished to this enterprise of the government.

Up to 1850 the tables published were of occultations visible in the United States. Since, however, the preparation of the tables has been in charge of the director of the Nautical Almanac, the list has been so

extended as to make it useful to geographers in general as well as to those of the United States. This extension was rendered important on account of the surveys undertaken by our government in other parts of the globe. Also, a table has been added, giving the correction of the latitude due to the oblate spheroidal figure of the earth.

When we consider the character and condition of the vast continent of North America, which it belongs to us chiefly to reduce to a habitable and civilized state, we shall perceive that the practical scientific explorer has no higher duty than to settle the geography, the magnetism, the natural history, and the climate, of these regions.

Researches.

At the session of the Regents in 1849, an appropriation was made to supply Lieutenant Gilliss with a telescope for his expedition to Chili, to aid him in his observations for a new determination of the distance of the inferior planets, and, consequently, of the actual distances of the several members of the solar system. A subsequent appropriation was made for the purchase of an astronomical clock for the same purpose. The first appropriation was repaid to the Institution by a grant from Congress to cover the expenses of the expedition, and the second will also be reimbursed by the purchase of the clock and all the other instruments by the Chilian government, for the permanent establishment of an observatory in that country.

By these operations, the Institution has been the means of rendering essential aid to science, without in the end diminishing the amount of its income. Lieutenant Gilliss, after voluntarily exiling himself from his family and his country for four years, has returned with a rich harvest of materials in astronomy, meteorology, magnetism, and natural history, in the reduction, generalization, and description of which the Institution may also furnish important aid.

The sum of one hundred and fifty dollars has been advanced to Professor C. B. Adams, of Amherst College, to defray in part the expense of an exploration of the molluscs of the West Indies. This subject is intimately connected with the geological changes which have taken place on the surface of our globe; and it was with particular reference to this point that Professor Adams undertook these researches. This is his second expedition to the same regions; and in both instances the Smithsonian Institution has seconded his proposition, and warmly recommended it to the favorable consideration of the trustees of Amherst College. A small sum appropriated in this way, though not enough in itself to produce much effect, is still sufficient to complete the amount to be raised, and thus serve to determine the commencement of the enterprise.

Meteorology.

The general system of observations relative to the meteorology of the continent of North America, described in the previous Reports, has been continued and extended. It consists at present of the following classes, viz:

1. The Smithsonian system proper, made up of voluntary observers in different parts of the United States, who report immediately to the Institution.

2. The system of observations of the University of the State of New York, re-established under the direction of this Institution, and supported by the State of New York.

3. The system of observations established under the direction of this Institution, by the State of Massachusetts.

4. The extended system of observations made at the several military posts of the United States, under the direction of the Surgeon General of the army.

5. Separate series of observations by exploring and surveying parties, in some cases directed, and in part furnished with instruments, by this Institution.

6. Meteorological records from British America, consisting of observations made at the various posts of the Hudson's Bay Company, and at the residence of private individuals in Canada.

In the first three of these classes there are about two hundred observers distributed over the entire continent. In the older States they are very thickly distributed, and they are entirely wanting in none. Texas, Arkansas, the Indian Territory, Missouri, Iowa, and Minnesota, have each competent and reliable observers reporting directly to the Smithsonian Institution, in addition to those at the military posts which are in the same regions.

Further westward, and more widely separated, the observers at the military posts, and those of surveying and exploring parties, continue the connexion of the system to the Pacific coast, where the number of military posts is greater, and private observers are again found.

The New York system embraces twenty-five academies as stations, all furnished with new and reliable instruments at the expense of the State.

In Massachusetts twelve stations are furnished in like manner, of which eight have reported.

In 1852 ninety-seven military posts reported meteorological observations, and for 1853 the number will be greater rather than less.

The whole number of stations and observers available in making the deductions for 1852 was three hundred and fifty; and this number, either reporting directly to the Institution or furnishing their observations for its use, may be relied upon for the current year.

Besides the observations derived from this general system, a large collection has been procured from individuals in different parts of the country, who have kept records of the weather, in some cases for many years. This collection was obtained by issuing a circular from the Institution, requesting copies of any records which might have been kept relative to the climate of this country. The amount of information received in answer to this circular was far greater than was expected, and much more valuable matter was thus called forth than was previously known to exist.

In order that the materials procured from the aforementioned sources may be rendered available for scientific or practical purposes, it is necessary that they should be reduced, discussed, and arranged for

publication. This work was commenced at the close of 1851, and has been prosecuted with considerable vigor during the past year. It was given by me in charge to Mr. Lorin Blodget, of Western New York, who has engaged in the work with much ardor, has devoted to it his whole time and attention, and has evinced an unusual degree of talent for investigations of this character.

The results which have thus far been obtained are of interest to the science of meteorology, and valuable to the practical arts of life. The following is a descriptive list of the deductions presented in a tabular form:

Temperature Tables.

1. Tables of general mean temperature for a series of years, embracing a summary of the annual means for the years 1849, 1850, 1851, and 1852, with a general summary of reliable observations of mean temperature on the North American continent.
2. Tables of mean temperature for each month, season, and year, for 1849, 1850, 1851, and 1852, embracing 273 stations in 1849; 284 in 1850; 300 in 1851; and 396 in 1852.
3. Tables of mean temperature at each observed hour for the same periods and the same stations.
4. Tables of the monthly extremes of temperature, with the range above and below the monthly mean, for the same periods and the same stations.
5. Collection of tables of temperature at different stations, observed for a series of years.
6. Miscellaneous tables of temperature, not conforming entirely to either of the above divisions.

The first class of tables embraces six hundred and seventy stations, distributed over the entire continent, from the West Indies and Mexico to the Polar seas.

The second class has a more limited range, and is generally confined to the United States and its territories, as observed by the military system, and that of the Smithsonian Institution, with a few stations in Canada and the British possessions on this continent.

The third class of tables is nearly the same in extent with the preceding, and for three complete years, viz: 1850, 1851, and 1852.

The fourth class is of the same extent and time.

The fifth is a climatic arrangement of tables from various stations extending in continuous series over periods varying from five to sixty years.

Tables of Precipitation.

1. Tables of distribution of precipitation in rain and melted snow for each month, season, and year, for 1849, 1850, 1851, and 1852.
2. General tables of precipitation for a series of years, containing the results of the preceding tables, with a general summary of all reliable and accessible observation of fall of rain on the North American continent. These tables give results from about four hundred stations, principally in the United States, its Territories, and the West Indies.

3. Irregular tables and single series, extending over long periods, and where reliable observations have been made.

A series of charts has been constructed to exhibit the distribution of temperature on the North American continent, by isothermal lines; and also another series, illustrative of the distribution of precipitation for each month, season, and year of 1850, 1851, and 1852, and for the periods given in the general tables. It is proposed to present these results to Congress as a part of the Annual Report of the Regents, and as the first fruit of the labors of the Smithsonian Institution on the subject of meteorology.

Catalogue of Libraries.

In addition to the preparation of the work previously mentioned, Professor Jewett has continued his experiments on the new process of stereotyping, to be used in his system of cataloguing. Much difficulty and delay have been experienced in the prosecution of these experiments, on account of the want of workmen to construct the peculiar apparatus required. The services of an ingenious and skilful artisan have, however, been secured; and the process is now brought to such a state that it can be applied with certainty, and abridgment of labor, to produce the best specimens of typography.

The system of catalogues described in previous Reports, though future experience may suggest other improvements, is now apparently perfect in all its details. A stereotyping office has been established in the basement of the west wing of the Smithsonian building, and the Institution is ready to commence the formation of a general catalogue of the principal libraries of the United States. The commission to which the catalogue system was referred, recommended that measures be taken to procure the preparation and printing of the catalogue of the Library of Congress. The cost of the first collection of stereotype titles can be best borne by this library, and it will be the first to reap the benefit of this invention. The stereotype blocks of the titles can be preserved in the Institution, and a new catalogue annually furnished at a small expense, with all the additions inserted in their proper places. The same titles will be employed in printing the catalogues of other libraries, and the new titles which may be prepared for these will, in turn, be used for the Library of Congress.

I beg leave to commend this subject to the immediate consideration of the Board of Regents. The whole plan is in perfect harmony with the active operations, and has always received my cordial commendation. The Institution has incurred the expense of reducing it to practice, so far as it depends on mechanical arrangements; and it now only requires to be applied, to realize all the benefits which have been anticipated in regard to it, to do honor to the Institution and to confer deserved reputation on its author.*

* Note.—Since this report was presented to the Board of Regents, Congress has appropriated three thousand dollars to commence the catalogue of its library on the stereotype plan, under the direction of the Smithsonian Institution.

Library.

During the last year the library has received important additions from the books presented in exchange for the volumes of the Smithsonian Contributions and other publications. The whole value of the works thus received during the year, according to the estimate of Professor Baird, is not less than from four to five thousand dollars. From this source alone a highly interesting and valuable collection of books, pertaining to all branches of positive knowledge, will, in time, be obtained. The reputation which the publications of the Institution have given it abroad, has induced individuals to present a number of valuable works to the library. For an account of the whole, I must refer to the report of Professor Jewett, herewith submitted. The library has also been increased by the purchase of such books as were required in the operations of the Institution, and with a series of scientific and other periodicals.

The copyright law is still in existence, and the library has received, during the past year, the usual number of articles from this source. The remark, however, may again be made with truth, that the action of this law, as it now exists, imposes a burden on the Institution from which it should be relieved.

According to the report of Professor Jewett, the whole number of articles now in the library is twenty-one thousand seven hundred.

Museum of Natural History.

The additions to the collection in natural history, under the persevering efforts of Professor Baird, have increased in a compound ratio over those of previous years. Large additions will also be made by the exploring expeditions which are about to leave for the different parts of this continent and distant seas; but the expense of preparing and transporting these, it is hoped, will be defrayed by the general government. For a detailed account of the number and variety of the specimens collected, I must refer to Professor Baird's report accompanying this communication.

Gallery of Art.

Besides a library, a museum, and lectures, the act of Congress establishing the Smithsonian Institution directed the formation of a gallery of art. The only articles belonging to the Institution which have been yet collected in accordance with the last-mentioned regulation of Congress, are the valuable series of engravings by the old masters, described in a previous report. One of the original propositions of the programme is that of encouraging art, by providing a suitable room for the exhibition of pictures free of expense to the artist. In accordance with this, the large room in the west wing will be devoted to this purpose. It now contains a very interesting series of portraits, mostly full-size, of one hundred and fifty-two North American Indians, with sketches of the scenery of the country they inhabit, deposited by the artist who painted them, Mr. J. M. Stanley. These portraits were all

taken from life, and are accurate representations of the peculiar features of prominent individuals of forty-three different tribes, inhabiting the southwestern prairies, New Mexico, California, and Oregon. The faithfulness of the likenesses has been attested by a number of intelligent persons who have visited the gallery, and have immediately recognised among the portraits those of the individuals with whom they have been personally acquainted. The artist expended in the work of obtaining these pictures ten years of his life, and perseveringly devoted himself to his task in the face of difficulties and dangers which enthusiasm in the pursuit could alone enable him to encounter. The Institution has published a descriptive catalogue of these portraits, which are of interest to the ethnologist as representatives of the peculiar physiognomy, as well as of many of the customs, of the natives of this continent.

Lectures of the Institution.

Public lectures have become one of the characteristics of the day, and next to the press perhaps tend, more than any other means of diffusing knowledge, to impress the public mind. The liberal price paid by the Lowell Institute, and some of the associations in our large cities, induces men of reputation to devote themselves to the preparation of popular lectures. In some parts of the country a number of adjacent cities or villages enter into an arrangement by which the same lecture may be repeated, in succession, at each place; and in this way the amount paid becomes sufficient to call forth the best talent. A plan of this kind has been adopted by the Athenæum of Richmond, Virginia, with reference to the lectures before the Smithsonian Institution, the effect of which has been mutually beneficial. Popular lectures appear better adapted to present literary and historical facts, and to give information relative to subjects of art and of morals, than to impart a knowledge of scientific principles. These require more attention and continuous thought than can be generally expected from a promiscuous audience. Hence the scientific lecturer frequently aims at a brilliant display of experiments, rather than to impress the mind with general principles.

Local lectures are too limited in their influence to meet a proper interpretation of the will of Smithson; yet they were ordered by Congress, and are calculated to do more good in this city than in any other part of the Union.

In selecting lecturers, the consideration of mere popular effect has not been regarded. The persons chosen have been such as to give weight to the lecture, and to reflect credit on the Institution. The object has been to give instruction rather than amusement—to improve the public taste rather than to elicit popular applause. The Institution, to be respected, must maintain a dignified character, and seek rather to direct public opinion than to obtain popularity by an opposite course.

The moral effect which the lectures have on the city of Washington cannot be otherwise than beneficial. When the weather is favorable, the room is every evening crowded before the hour of commencement with an intelligent audience. The lecturers have generally been per-

sons from a distance, who have expressed surprise to find such a large and respectful attendance in a city which is commonly thought to be exclusively devoted to politics and amusement. The plan of inviting gentlemen of reputation and influence from a distance renders the Smithsonian operations familiar to those best qualified to appreciate their value, and best able to give a correct account of the character of the Institution in their own districts of country, as well as to vindicate its claims to the confidence and friendly regard of the public. The results of this course, and the distribution of the volumes of Contributions to colleges and other institutions, it is hoped, will so establish the Institution in the good opinion of the intelligent and influential part of the community, that it may bid defiance to the assaults of those who are ignorant of its true character, or are disappointed in not sharing its honors without the talents or the industry to win them.

The following is a list of the titles of lectures given during the last session of Congress, with the names of the gentlemen by whom they were delivered:

A course of three lectures by Dr. E. K. Kane, U. S. N., on Arctic Exploration.

A course of three lectures by President Mark Hopkins, of Williams College, on Method applied to Investigation.

A course of four lectures by Prof. W. B. Rogers, of the University of Virginia, on the Phases of the Atmosphere.

A course of twelve lectures by Dr. Benjamin Silliman, sen., of Yale College, on Geology.

A course of two lectures by Prof. C. C. Felton, of Harvard University, on Greek Literature.

One lecture, by Job R. Tyson, esq., of Philadelphia: Queen Elizabeth and Oliver Cromwell, their characters and times, contrasted and compared.

A course of six lectures by Dr. B. A. Gould, jr., of Cambridge, on the Recent Progress of Astronomy.

A course of six lectures by Prof. Louis Agassiz, of Cambridge, on the Foundation of Symmetry in the Animal Kingdom.

A course of six lectures by Prof. B. Silliman, jr., on the four ancient elements—Earth, Air, Fire, and Water.

Omitted from previous report: A course of twelve lectures by Dr. Henry Goadby, on the Structure and Functions of Insects.

In the last Report to the Regents some general remarks were made relative to the library and museum, and nothing has since occurred to change the opinions then expressed. On the contrary, the experience of another year has tended to confirm these opinions, and to clearly exhibit the fact that it will be impossible to continue with the present income some of the most important operations, and rigidly adhere to the resolution of the Regents of 1847, to devote one half of the whole income to the library and museum, besides all the expenditures still required on the building for the accommodation of these objects. By a reference to the annual reports of the Executive Committee, it will be seen that the general incidental expenses have continually increased

from year to year; and it is evident that they must continue to increase in a geometrical ratio, on account of the greater repairs which, in time, will be required on the building. After deducting from the income the cost of repairs, lighting, and heating; of messenger, attendants, and watchmen; of stationary, transportation, and postage; after dividing the remainder by two, and deducting from the quotient the expense of the public lectures, the final sum to be devoted to the most important, and, indeed, the only legitimate object of the bequest, is exceedingly small.

The attempt has, however, been made in good faith to carry out the resolution of February, 1847; and if items which may properly be charged to the library and collections were added to this side of the account, the balance up to the present date would be in favor of the active operations. But the plan has not been found to work well in practice. The income is too small properly to support more than one system of operations, and therefore the attempt to establish and sustain three departments, with separate ends and separate interests, must lead to inharmonious action, and consequently to diminished usefulness.

However proper such a division of the income might have been in the beginning, in order to harmonize conflicting opinions, and to submit with proper caution the several proposed schemes to a judicious trial, the same considerations do not now exist for its continuance; changes have since occurred which materially alter the conditions on which the resolution was founded. The plan of active operations was not at first fully understood even by the literary men of the country. It was considered chimerical, and incapable of being continued for any length of time; and hence it was thought important to provide for the means of falling back upon a library and collections. The experience of six years has, however, established its practicability and importance, and it is now considered by the great majority of intelligent persons who have studied the subject, the only direct means of realizing the intention of the donor. Again: the building was to have been finished in five years, and the income after this was to be increased by the interest on the remaining surplus fund; but the Regents have found it necessary, for the better security of the library and museum, to add fifty thousand dollars to the cost of the edifice; and ten years will have elapsed from the beginning, instead of five, before any income from the surplus fund will be available. This additional expense is not incurred for the active operations, and the question may be asked whether they ought to bear any part of this additional burden. Furthermore, at the time the division was made, it was thought obligatory on the part of the Institution to support the great museum of the Exploring Expedition; but the Regents have since concluded that it is not advisable to take charge of this collection; and Congress, by its appropriation for the enlargement of the Patent Office, concurred in the opinion expressed in the Senate by the Hon. Jefferson Davis, that it was a gift which ought not to be pressed upon the Institution. The inquiry may also, in this case, be made, whether it is advisable in the present state of the funds, and the wants of the active operations, to expend any considerable portion of the income in the production of a collection of objects of nature and art. Again: the active operations are procur-

ing annually, for the library, by exchange, a large number of valuable books, which, in time, of themselves will form a rare and valuable collection; and even if the division of the income is to be continued, a sum equal in amount to the price of these books ought to be charged to the library, and an equal amount credited to the active operations.

Though a large library connected with the Institution would be valuable in itself, and convenient to those who are in the immediate vicinity of the Smithsonian building, yet, as has been said before, it is not essential to the active operations. It would be of comparatively little importance to the greater number of the co-laborers of the Institution, who are found in every part of the United States, and are not confined even within these limits. The author of the great work on the American Algæ, now publishing in the Smithsonian Contributions, is a resident member of Trinity College, Dublin; and very few of the authors of the Smithsonian memoirs reside in Washington. The libraries, therefore, of the whole country, and in some cases of other countries, are at the service of the Institution and employed for its purposes.

Similar remarks apply to the museum. It is not the intention of the Institution to attempt to examine and describe within the walls of its own building all the objects which may be referred to it. To accomplish this, a corps of naturalists, each learned in his own branch, would be required, at an expense which the whole income would be inadequate to meet. In the present state of knowledge, that profound attainment necessary to advance science can be made by an individual, however gifted, only in one or two narrow lines; and hence several members are required to complete a single class in any of the learned academies of Europe: therefore the plan which was once proposed, of establishing on the Smithsonian fund an academy of associated members, was entirely incompatible with the limited income of the Institution. The more feasible and far less expensive organization was adopted, of referring, for investigation, all scientific questions of importance, as well as objects of natural history, to persons of reputation and learning in different parts of the United States, and perhaps, in some cases, in foreign countries. By the operation of this plan, which has been found eminently practicable, the collections, as well as the libraries of the whole country, are rendered subservient to the use of the Institution.

There can be but little doubt that, in due time, ample provision will be made for a library and museum at the capital of this Union worthy of a government whose perpetuity depends upon the virtue and intelligence of the people. It is, therefore, unwise to hamper the more important objects of this Institution, by attempting to anticipate results which will be eventually produced without the expenditure of its means.

The prominent idea embraced in the Smithsonian organization, is that of co-operation and concerted action with all institutions and individuals engaged in the promotion of knowledge. Its design is not to monopolize any part of the wide fields of nature or of art, but to invite all to partake in the pleasure and honor of their cultivation. It seeks not to encroach upon ground occupied by other institutions, but to ex-

pend the funds in doing that which cannot be as well done by other means. It gives to the words of Smithson their most liberal interpretation, and "*increases and diffuses knowledge among men*" by promoting the discovery of new truths, and by disseminating these in every part of the civilized world.

Respectfully submitted:

JOSEPH HENRY,
Secretary Smithsonian Institution.

The annexed document does not form a part of the proceedings of the Board of Regents reported to Congress. It was not presented to the Institution until after the adjournment of the Board, and will not come before them until their meeting in January, 1855.

For the report in behalf of the other members of the special committee, viz: Hon. JAMES A. PEARCE, Hon. JAMES M. MASON, Hon. RICHARD RUSH, Hon. JOHN W. MAURY, Gen. JOSEPH G. TOTTEN, and Prof. A. D. BACHE, see page 79. J. H.

MINORITY REPORT.

Hon. J. MEACHAM, *of the Special Committee of the Board of Regents of the Smithsonian Institution, to which were referred the resolutions of Hon. Mr.* FITCH *and Hon. Mr.* MEACHAM *relative to the distribution of the income of the Smithsonian fund, etc., dissenting from the report made by Hon.* J. A. PEARCE, *chairman, on behalf of said committee, made the following report:*

The special committee of the Board of Regents, appointed on the 12th of March, 1853, upon the resolution of the Hon. Mr. Fitch, were charged with the examination of the following questions:

1. Whether the equal division of the income of the Institution between the Library and the Museum on the one part, and Publications, Researches, and Lectures on the other, as established by the "compromise" resolutions passed on the 26th and 28th of January, 1847, shall for the future be observed; and if not, what principle of division shall hereafter be followed.

2. Whether the annual appropriations for the purposes of the Institution shall continue to be made, as for the last four years, in general, to be distributed by the Secretary and the Executive Committee, or whether they shall be voted specifically by the Board.

The latter question presented by the resolution of the undersigned has already received the favorable action of the committee and of the Board. The appropriations, for the future, are to be made for specific objects.

The former question is the only one now at issue. The committee have presented their report, in which they recommend the abrogation of the compromise, with a view to greatly diminishing the share of the income which, under it, would be given to the Library, and bestowing the greater part of the accruing interest upon the department of Publications and Researches.

The undersigned finds himself constrained to differ from the committee in the general positions of the report. He believes, indeed, that the compromise was inconsistent with the requirements of the charter and the obvious intentions of Congress; but, that the rescinding of it for the purpose of still further reducing the appropriations for the library would be a yet wider departure from the plain demands of the law and the design of the law-giver.

The undersigned had no opportunity, before the presentation of the report, to state to the committee the views which he entertained on the subject; and it has become necessary for him to express a formal, written dissent.

A careful and laborious investigation of the history of the Institution, extending over a period of nearly twenty years, has been found indispensably necessary, in order to form an intelligent opinion upon the question in its relations to the testator, to Congress, to the administrative authorities and officers of the Institution, and to the people.

The bequest of James Smithson is made in the following terms: "To the United States of America, to found at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men."

All indication which we have of the intentions of Mr. Smithson is given in this brief sentence. He drew out no scheme of an institution. He intimated no preferences, prescribed no limitations. The words which he used are the most general and comprehensive that he could have employed. To found "*an establishment;*" not specifically a college, nor an observatory, nor a library, nor a learned society; yet not excluding either of these, nor any other of the many instrumentalities which are "for the increase and diffusion of knowledge among men." It is "*for* the increase and diffusion;" any instrumentality conducive to that end. He did not say "to increase and to diffuse knowledge." Such a phraseology might be open to the criticism that no institution nor corporation can be said directly to increase knowledge. Institutions can merely furnish facilities and means through which individual minds may increase knowledge. All active operations whereby knowledge is increased are those of individual minds alone.

Smithson gave his property to found an establishment promotive of the increase and diffusion of knowledge. The choice of instrumentalities for this end he left entirely to the trustees whom he selected. The promotion of the great end was all that he prescribed. This comprehensive phraseology of the will is not limited by any other expression or implication of the intention of the liberal testator. These words are *all* that we know of his wishes. The natural and irresistible inference is, that, not knowing the particular instrumentalities which could be most safely employed by the trustees selected, nor the kind of institution which, under their management, would be most conducive to the great and noble end which he proposed, and having entire confidence in their integrity and intelligence, he preferred to make no restrictions, no reservations, no intimations respecting details, means, and instrumentalities, but to leave them entirely to the choice of the trustees.

The United States are the trustees. When the fact of the bequest was made known to the President, he communicated it to Congress in a special message dated the 17th of December, 1835, in which he says:

"The Executive having no authority to take any steps for accepting the trust, and obtaining the funds, the papers are communicated with a view to such measures as Congress may deem necessary."

This message was referred to a committee in each branch of the national legislature. These committees considered the question of the constitutional authority of Congress to accept the bequest. They agreed

in the opinion that, inasmuch as the institution was to be founded *at Washington*, they were thus enabled to accept the trust, in the exercise of their power as *parens patriæ*, or local guardian of the District of Columbia.

The report of the Senate Committee on the Judiciary led to considerable discussion on this question of the constitutional right to accept the trust, as declared in the will. Some senators, supposing that the words "*among men*" indicated the intention of the testator that the fund should be held in trust for the benefit of *all mankind*, contended that Congress had no right to hold a charitable fund under such a trust, nor even for the whole United States. Most of the senators who spoke upon the question held the doctrine of the reports, that Congress had the right, *as guardian of the District of Columbia*, to accept this trust; that, though founded among men at Washington, and primarily beneficial to this city, it might still offer its advantages to the whole country—to all men. It need not exclude, and would not exclude, men elsewhere from a participation in its benefits; as Colleges had been founded by Congress as *parens patriæ* of the District, but students from other places were allowed the full benefit of these institutions.

Those who expressed the opinion that the money was to be held in trust for *all mankind*, and that it could not be held by Congress as *parens patriæ* of the District, voted against accepting the bequest.

The bequest was accepted and the money received. From that time Congress has stood in the place of trustees, under the will of Smithson; *morally* responsible for the correct interpretation of the will; having the power, and in honor bound to exercise it, to found an institution for the ends of the bequest; but not amenable to any authority upon earth, except to their own constituency, for the interpretation they put upon the will. They gave no bonds for the faithful performance of the trust. Their accounts are to be rendered to no court. Congress is the final authority in the matter. If they err, there is no power of correction except in themselves and in the people who elect them.

It would be too long a task for this occasion to consider fully the multitude of schemes which were proposed for the application of the Smithsonian fund; but it is proper and requisite for a full understanding of the case, that it should be known that a great variety of plans were proposed, discussed, and rejected. An enumeration of these projects is all that will here be attempted. It will be seen that among them were several containing every important feature of the scheme which is now proposed to be substituted for the library.

Soon after the legacy had been received into the treasury, the Secretary of State, by direction of the President of the United States, addressed a circular letter dated 19th July, 1838, to several gentlemen "versed in science and familiar with the subject of public education," asking their views as to the best mode of disposing of the fund.

Answers were received from the Hon. John Quincy Adams, Francis Wayland, D. D., President of Brown University, Dr. Thomas Cooper, of Columbia, S. C., the Hon. Richard Rush, and President Chapin.

Mr. Adams had reflected much upon the subject, and his views, with regard to the general management of the fund, were marked with great practical wisdom. Many of them were incorporated into almost every

plan subsequently proposed, and some are prominent features of the present charter. He thought that no part of the fund should be applied to the endowment of any school, college, university, or ecclesiastical establishment; that all appropriations should be made from the annually accruing interest, and not from the principal. He proposed to devote the interest of the fund for seven years to the establishment of an astronomical observatory, and the accumulation of a supplementary fund for its permanent support, leaving the fund itself unimpaired. He strongly wished that this principle might be made the fundamental law of the institution—namely, that of appropriating the fund, for a limited time, to a special object, providing amply and permanently for it, so that it might remain a self-sustaining and well-endowed department, and leave the fund unimpaired for future appropriations to other objects.

President Wayland seemed to take it for granted that the institution was to be, in some sort, a university. He stated briefly the position which he supposed it should occupy between the close of a collegiate education and a professional school, and sketched the outlines of a plan.

Dr. Cooper stated, that two courses only suggested themselves to his mind; one, annual premiums for the best treatises on given subjects; the other, an institution of the character of an university. The former course he would not recommend; we have not literary and scientific men enough, and it would be apt to degenerate into a political and party institution, in various ways. He proposed, in order to escape the constitutional objection to an university, that the fund should be transferred to the corporation of Georgetown, (a sufficient approximation, as he thought, to Mr. Smithson's proposed locality,) who should found an university, open to graduates of other colleges. The studies were to be only mathematical and physical; no Latin, no Greek, no mere literature.

Mr. Rush objected to an university, or college, or any institution looking to primary education, as not meeting, in his view, the intentions of Mr. Smithson. The institution ought to be as comprehensive in its objects as possible, as it must be national in its government. He thought that the consuls, and naval and military officers, and foreign ministers of the United States, might efficiently aid the main objects of the Institution, by collecting seeds and plants, communicating information respecting natural history, antiquities, &c. He would have a building for the public business, and grounds for reproducing seeds for distribution. The officers should be a Director, Secretary, Librarian and Treasurer, appointed by the President and Senate. The institution to be subject to the visitation of the President, aided by a standing Board to consist of the chief officers of the government. The institution to have its press. Nothing to be printed, but under the sanction of the director and standing board of visitors. The board to have the right, to this and other ends, of calling in the assistance of three or more scientific or literary persons. The director to correspond with learned societies and persons. A council to assemble once a month, to consist of the officers of the institution and the lecturers attached to it, before whom all communications should be laid: such as were proposed for

publication, to be brought before the visitors for their decision. Lectureships to be established, and lecturers to be appointed by the President and Senate, with salaries large enough to command the best men, and admit of the exclusive devotion of their time to study and investigation. Lectures to be deposited for publication, if desired. It was supposed they might yield *Contributions to the increase and diffusion of knowledge* among men. The democratic principle, as modified by our American system, to be particularly discussed and defended. If possible, a small class of young men, say two from each State, to attend the lectures; their expenses to be paid, and their best efforts to be called forth by prizes.

President Chapin supposed that Mr. Smithson, in making his will, probably had his eyes upon those modern institutes and universities of Europe which are designed to receive only graduates, for the purpose of advancing them to the highest grades of learning, and thus to give them power to enlarge the boundaries of knowledge, by fresh discoveries and investigations. He proposed professorships to be filled by the ablest men, with ample salaries, who were to lecture, and conduct investigations in their several departments. He would have buildings only for public purposes, and extensive and well chosen library and apparatus. Fees for students to be small. An astronomical observatory to be connected with the institution.

On the 14th of December, 1838, a memorial was presented to Congress by Charles Lewis Fleischmann, proposing the establishment, upon the Smithsonian legacy, of an Agricultural Institution for 100 pupils, with a farm of 640 acres, beet-sugar manufactory, mill, workshops, &c. The plan of the institution was drawn out in detail, as to buildings, course of study, officers, &c. The estimated sum required to establish it, and furnish it with a permanent endowment, was $298,700, or the whole income of the fund for about ten years.

In January, 1839, a joint committee of both branches of Congress was charged with the consideration of the application of the fund. The two committees were divided in opinion. That of the committee of the Senate, as expressed by their chairman, Mr. Robbins, was "that this institution should make one of a number of colleges, to constitute a university, to be established here, and to be endowed in a manner worthy of this great nation and its immense resources." The opinion of the committee of the House of Representatives was, "that no part of the said Smithsonian fund, principal or interest, should be applied to any school, college, university, institute of education, or ecclesiastical establishment," but that the first appropriations from the fund should be for an astronomical observatory. Two bills embodying respectively, or providing for the execution of the above plans, were by agreement reported to both branches of Congress. The university plan was discussed in the Senate, and on the 25th of February, 1839, the bill was laid on the table, by a vote of 20 to 15. The plan for providing an observatory was repeatedly urged upon the attention of Congress by the venerable J. Q. Adams, who presented several elaborate reports, and drew several bills embodying his views. But the subject was not acted upon, before the government had provided an observatory from other funds.

On the 17th of February, 1841, two bills were reported to the Sen-

ate by the Library Committee; one, a bill presented on the 10th of February by Mr. Linn, and referred to that committee; the other, a bill drawn, as is supposed, by Mr. Preston. Both of these bills make the Smithsonian Institution to consist of a superintendent and six professors, whose duties are to be prescribed by the National Institution for the Promotion of Science. Both confer the whole management of the Smithsonian Institution, as to its scientific and literary affairs, upon the National Institution. They differ merely in details of organization, &c. In these bills, provision is made that all works of art, and books relating thereto, and all collections and curiosities, belonging to the United States, shall be transferred to the Institution.

On the 6th of June, 1844, Mr. Tappan, from the Library Committee of the Senate, reported a bill for the establishment of the Smithsonian Institution. This bill provides for the selection of grounds for horticultural and agricultural purposes; for a building described nearly as in the present charter, to cost not more than $80,000; a building for plants not to exceed $20,000; and dwellings for officers not to cost more than $78,604. It gives to the Institution the collections of natural history belonging to the United States, to be under the care of the professor of natural history. It requires that Smithson's effects shall be kept separately; provides for a superintendent to take charge of building and grounds, to be secretary of the board, and discharge the duties of professor of agriculture and horticulture, and allows him, with the approbation of the managers, to employ gardeners and laborers. It authorizes the appointment of professors of natural history, chemistry and astronomy, with others, and the employment of able men to lecture. It authorizes the managers to prescribe agricultural experiments, to distribute seeds, &c., and to admit students. All instruction to be gratuitous. Mr. Tappan's idea of the institution was that it should be like the Garden of Plants, in Paris.

On the 12th of December, 1844, Mr. Tappan brought in a bill similar to the preceding. It contained more minute details respecting the duties of the professors and lecturers, in reference to the illustrations of subjects connected with the productive and liberal arts, experiments of new modes and instruments of culture, chemical analysis of soils and their enrichment, &c. It provides for a professor of geology. It prescribes that the books purchased for the institution should consist of works on science and the arts, especially such as relate to the ordinary business of life, and to the various mechanical and other improvements and discoveries which may be made.

It was in January, 1845, that Mr. Choate first proposed in the Senate the Library Plan. It came up as an amendment to Mr. Tappan's bill, and appears in the following form as the 8th section of the bill, as it was passed:

"Sec. 8. And whereas an ample and well-selected public library constitutes one of the most permanent, constant, and effectual means of increasing and diffusing knowledge among men: therefore,

"*Be it further enacted*, That an annual expenditure of not less than twenty thousand dollars be made, from the interest of the fund aforesaid, under the direction of the said managers, in the purchase of books and manuscripts, for the formation of a library of the institution aforesaid, which shall comprehend, in a due proportion, without preference or exclusion of any works pertaining to all the departments of human knowledge, as well physical science, and the ap-

plication of science to the arts of life, as all other science, philosophy, history, literature, and art; and which, for extent, variety, and value, shall be worthy of the donor of the said fund, and of this nation, and of the age."

All other amendments thought necessary to harmonize the various provisions of this bill were made, and the bill, after having been warmly and zealously discussed, was, on the 23d of January, 1845, passed.

It is proper to remark, that this bill, in all the provisions for administration, furnished the basis of many of those that were subsequently presented, including that of the pesent charter.

This bill having been sent to the House of Representatives on the 28th of January, 1845, was read a first and second time and referred to the Committee of the Whole.

On the 10th of February, Mr. Owen offered a substitute for the bill, which was referred to the same committee. This substitute will claim more particular attention among the projects of the next session. On the 28th of February, Mr. Pratt also presented a substitute.

As this was the short session of Congress, there was no place found for discussion or final action upon the subject.

Mr. Pratt's bill, just alluded to, contained a plan different from all that had preceded it. Its prominent provisions were to add to the principal of the Smithsonian fund so much of the accrued interest as would make the whole amount $666,666; which was to be loaned to the United States at 6 per cent. interest, thus producing an annual revenue of $40,000. The Board of Managers were to erect a building to cost not more than $60,000, and were to devote $30,000 a year "for the encouragement of improvements in the common school systems of the several States; *for stimulating researches* in the natural sciences, particularly astronomy, geology, and chemistry; and for promoting useful inventions and discoveries for rendering labor more successful in promoting the welfare of persons employed in the three great departments of human industry—agriculture, manufactures, and commerce: thus stimulating attention to intellectual and physical improvement, in a manner which would constitute a permanent and effectual mode of 'increasing useful knowledge among men,' and furnish enduring mementos of the benevolent individual through whose liberality the Institution is founded and endowed."

At the next session of Congress Mr. Owen, on the 19th December, 1845, presented a bill for the establishment of the Smithsonian Institution, which was read twice, and referred to a select committee, of which Mr. Owen was chairman.

This bill was similar to that which he had offered in the previous session, as a substitute for the Senate bill, and, so far as the organization of the Institution and the investment of the funds are concerned, nearly identical with that. But the objects of the Institution were essentially changed.

The prominent features of Mr. Owen's plan were, a *Normal School*, or seminary for the education of teachers, with professors and lecturers, who might be authorized to deliver lectures in various parts of the United States.

The managers were authorized to print lectures, essays, pamphlets, magazines, or other brief works for the dissemination of information

among the people. "And whereas knowledge may be essentially increased among men by instituting scientific researches," the managers are required, in prescribing the duties of professors, &c., to "have special reference to the increase and extension of *scientific knowledge* generally, by EXPERIMENT and RESEARCH."

The amount to be expended upon the library was limited to $5,000 a year. The collections of the government in natural history, &c., were given to the Institution.

The select committee, on the 28th of February, 1846, reported back Mr. Owen's bill with a substitute. The principal variations in the substitute from the original bill are, that the managers are created a body corporate and politic, and the limitation to the appropriation for the library is extended to $10,000 a year, instead of $5,000.

This bill was discussed in Committee of the Whole on the 22d, 23d, 28th, and 29th of April. Many amendments were made to the bill, among which were the following:

To strike out all that part of the bill which created a corporation. This amendment passed by a vote of 70 to 44.

To strike out all that part of the act relating to the Normal School, the instituting of scientific researches, &c.

Agreed to—ayes 72, noes 42.

An amendment proposing to appoint professors and lecturers was rejected—ayes 42, noes 77.

On the 23d of April, 1846, Mr. Morse proposed, in the House of Representatives, a substitute for Mr. Owen's bill, containing as the plan of operations the following:

"That so soon as the board of managers shall be regularly and legally organized, it shall be their duty to cause to be published, for the space of one year, in such of the most widely circulated newspapers in the United States and in Europe, as they may deem best, the offer of suitable *rewards or prizes* for the best written essay on ten subjects, the most practical and useful which the majority of said Board shall determine upon. And when, after a decision upon the relative merits of the different essays, they determine to which the prize shall be awarded on the several subjects, it shall be their duty to have as many copies of each of the essays printed as they may deem best, to be distributed to the governors of the several States; to the several incorporated literary Universities; to such European institutions as they may choose; and the balance to be distributed throughout the United States, by the members of Congress; thus fulfilling, in the letter and spirit, the wise and comprehensive intentions of the donor for the increase and diffusion of knowledge among men."

On the 29th of April, 1846, Mr. Giles proposed an amendment, in the House of Representatives, to Mr. Owen's bill, as follows:

"And [the managers] shall cause to be published, from time to time, books in raised characters for the education of the blind, to be distributed by the said board of managers, among the different State institutions for the education of the blind."

The amendment was rejected.

On the same day Mr. Wood proposed an amendment, to add the following section:

"*And be it further enacted*, That the sum of $20,000 of the interest of said fund be, and is hereby, appropriated annually for the purchase or publication of a library for the diffusion of useful knowledge, to be selected or published under the direction of the said board of managers, which shall include the best elementary popular works upon the history, geography, and statistics of the United States; upon botany, mineralogy, geology, agriculture, agricultural chemistry, mechanics, and physiology; and which said library shall be distributed among the several States and Territories, in the ratio of their representation, and be forwarded to the

several Governors of said States and Territories, to be distributed among the people thereof in such a manner as their respective legislatures shall determine, and shall most tend to increase and diffuse knowledge."

On the 29th of April, 1846, the question recurring on the committee's substitute for the original bill of Mr. Owen, as amended, Mr. Hough offered a substitute for the whole bill. This substitute, as amended, constitutes the present charter.

The first section was added apparently for the purpose of meeting the strenuous opposition to a corporation, by creating an "establishment," &c. The Normal branch was left out, and there were added sections providing for the employment of professors and lecturers, for the "increase and extension of scientific knowledge generally BY EXPERIMENT AND RESEARCH," for the PUBLICATION of lectures, essays, pamphlets, magazines, and "treatises on history, natural and civil, chemistry, astronomy, or any other department of useful knowledge; and [the Regents] may, at their discretion, offer and pay to any citizen or foreigner such sum or PRIZE as they may deem discreet for the best written production of any such prize, essay, or work."

The other variations in the substitute from the original bill are mostly verbal.

The action of the House of Representatives upon this substitute, and upon the bill, is recorded in the Congressional Globe for April, 1846, on page 749 of the volume for that session. It is here quoted in full, as exhibiting the intentions of Congress as unequivocally expressed by its votes.

"The question again recurring on the original bill, as amended,

"Mr. Hough offered the amendment of which he had given notice as a substitute for the entire bill, being a bill consisting of fourteen sections.

"Mr. Marsh moved several amendments, all with a view, as he said, to direct the appropriation ENTIRELY to the purposes of a LIBRARY.

"The first one was to section 7th, to strike out the words 'and such lecturers as may be employed by said board,' and the words 'and lecturers, and all other officers of the institution.'

"The question being taken, was decided in the affirmative—ayes 72, noes 39.

"So the amendment was agreed to.

"Mr. M. next moved to strike out section 8, as follows:

"SECTION 8. *And be it further enacted*, That the said board of regents shall employ so many and such able men to lecture upon useful subjects, and at such times and places, as they may deem most beneficial for the 'increase and diffusion of knowledge among men;' and shall also, during each session of Congress, cause a course of such lectures to be delivered, weekly or semi-weekly, publicly, in the lecture-room of said Institution, and shall make all suitable provisions for the accommodation of all members and honorary members of said Institution and of both houses of Congress.

"Also, an amendment to the 9th section, to increase the annual appropriation for the library from $20,000 to $25,000. Agreed to.

"Mr. Tibbatts moved to strike out the first section.

"The chairman decided the amendment to be out of order, that portion of the substitute bill having been passed.

"Mr. Marsh moved an amendment to strike out the 10th and 11th sections of the substitute, in the words following:

"SECTION 10. *And be it further enacted*, That the said board of regents shall make all needful rules, regulations, and by-laws, for the government of the Institution and the persons employed therein; and, in prescribing the duties of the professors and lecturers, they shall have reference to the introduction and illustration of subjects connected with the application of science to the productive and liberal arts of life, improvements in agriculture, in manufactures, in trades, and in domestic economy: and they shall also have special reference to the increase and extension of scientific knowledge generally, by experiment and research. And the said regents shall cause to be printed, from time to time, any lecture or course of lectures which they may deem useful. And it shall be the duty of each lecturer, while in the service

of the Institution, to submit a copy of any lecture or lectures delivered by him to the regents if required.

"SECTION 11. *And be it further enacted*, That it shall be competent for the board of managers to cause to be printed and published, periodically or occasionally, essays, pamphlets, magazines, or other brief works or productions for the dissemination of information among the people, especially works in popular form on agriculture and its latest improvements, or the sciences and the aid they bring to labor, manuals explanatory of the best systems of common-school instruction, and, generally, tracts illustrative of objects of elementary science, and treatises on history, natural and civil, chemistry, astronomy, or any other department of useful knowledge; and may, at their discretion, offer and pay to any citizen or foreigner such sum or prize as they may deem discreet for the best written production of any such prize essay or work; and shall, whenever required by resolution of either house of Congress, cause to be printed and delivered to such house, for distribution among the people at large, as public documents of Congress are distributed, so many copies of such lectures, essays, pamphlets, magazines, tracts, or other brief works, as they may procure to be written or delivered, under the provisions of this act, as shall be required by such resolution, the expenses of which to be paid out of the funds of said Institution.

"The amendment was agreed to.

"Mr. Thurman moved an amendment, to strike out the 12th section. Rejected.

"Mr. Douglas moved an amendment, as an additional section, (the 13th,) in the words following:

"SECTION 13. *And be it further enacted*, That the author or proprietor of any book, map, chart, musical composition, print, cut, or engraving, for which a copyright shall be secured, under the existing acts of Congress, or those which shall hereafter be enacted, respecting copyrights, shall, within three months from the publication of said book, map, chart, musical composition, print, cut, engraving, deliver or cause to be delivered, one copy of the same to the librarian of the Smithsonian Institute, and one copy to the librarian of the Congress library, for the use of said libraries.

"The question being taken, the amendment was agreed to.

"The question now being on adopting the substitute of Mr. Hough, as amended, was taken by tellers, and decided in the affirmative—ayes 83, noes 40.

"So the substitute was adopted.

"The committee then rose and reported the bill and amendments to the House.

"The question being first on agreeing to the substitute amendment of the committee—

"Mr. Boyd demanded the previous question, which was seconded.

"The main question was ordered.

"The yeas and nays were asked and ordered, and, being taken, resulted—yeas 81, nays 76.

"So the amendment of the committee was adopted.

"The bill was then ordered to be engrossed.

"Mr. Gordon demanded the yeas and nays on the passage of the bill; which were ordered, and, being taken, resulted—yeas 85, nays 76.

"So the bill was passed.

"Mr. Owen moved to reconsider the vote on the passage, and moved the previous question.

"The previous question was seconded, and the main question was ordered, and, being taken, was decided in the negative.

"So the House refused to reconsider the vote, and the bill is finally passed."

From the preceding history of this bill, taken from official sources, it is manifest—

1. That the proposition *to substitute* the establishment of *a library, instead of any other scheme*, which had been proposed, was most distinctly and emphatically advanced.

2. That *every* amendment subsequently proposed by Mr. Marsh, with the avowed and clearly understood purpose to effect that substitution, was adopted by the House of Representatives, by votes, as far as ascertained, of nearly two to one; as was also the amendment of Mr. Douglas.

3. That other amendments were rejected.

The bill was sent to the Senate, and there referred [April 30th] to a select committee of three—Senators Dix, Corwin and Lewis.

This committee, on the 1st June, 1846, reported a series of amendments to the bill, the principal of which were:

Inserting, instead of sections 4 and 5, the provisions of the former Senate bill for horticultural and agricultural grounds, buildings, &c.; and, with reference to the library clause, substituting an appropriation not exceeding an average of $25,000 annually, during the next three years, for the formation of a library, and after the three years an appropriation, not exceeding an average of $10,000 a year, for the gradual increase of said library.

These amendments were not adopted, and the bill finally passed the Senate in the precise form in which it had been received from the House of Representatives.

We have now followed the congressional history of the Smithsonian fund, from the time when the first information respecting the bequest was communicated, in a message from the President of the United States, in December, 1835, to the passage of the act which forms the charter of the Smithsonian Institution. The various schemes proposed for the application of the fund have been noticed in detail, and the action of Congress upon them stated.

We have seen that all the projects offered before Congress were passed by with neglect, or deliberately rejected, till Mr. Choate proposed the Library plan, making mandatory an annual expenditure of *not less than* $20,000 for the Library. We have seen that this passed the Senate, and was lost among the unfinished business of the short session in the House of Representatives—not by a direct vote.

We have seen that this Library plan was brought, subsequently, into direct competition and comparison with other plans, some of which contained every essential feature of the scheme of "active operations" since adopted into the Institution.

We have seen that these rival schemes were distinctly rejected by formal votes, and that the Library plan was supposed to have been established.

It is proper to carry this historical examination one step further, and to show, by reference to the speeches of those who advocated the Library plan, and of those who opposed it, how distinctly the issue was made, how well its whole import was understood, and how thoroughly its merits were canvassed.

It is not intended to dispute what the committee say, that it would be unsafe and improper to interpret a law by the opinions of a minority of those who voted for it. But, at the same time, it is manifestly proper, and in accordance with the dictates of common sense and with general usage, when an act has been passed after ample discussion, to consider the views of those who proposed and advocated the plan which prevailed, as those which governed Congress in the passage of the act, and the views of those who advocated rival projects, which were rejected, as those which could not be fairly said to have been favored by Congress.

The act which passed the Senate in 1845, is mandatory as to an appropriation of *not less than* $20,000 a year for the library. This part of the bill was introduced, as already stated, by Mr. Choate, of Mass., and the whole bill was by him so modified and shaped as to effect his purpose of making the Institution mainly a library. He spoke at great length upon the subject, and with great ability and eloquence. He

showed that this was a perfect fulfilment of the object of the bequest. He wished, for twenty-five years to devote $20,000 a year to the library. In that time, a magnificent library would be collected. A few years of the interest, devoted to the accumulation of a subsidiary fund, would provide for its perpetual support. The great object would then be so far accomplished that it would take care of itself, or might safely be entrusted to the liberality of the public; and the whole fund would be left unimpaired, yielding its income forever, for new and ever varying applications. He showed that a large library was the particular instrumentality which was first and most needed in this country for the increase of knowledge; that it would be at the same time pre-eminently diffusive; that it consulted for all branches of knowledge; that it was less liable to abuse than almost any other mode of applying the fund; that neither the library of Congress nor any other library of the country could ever meet the demand; that in no other way, so far as could be seen, could this greatest of all the wants of American science and learning be met; and that, while it was met in this way, there would be not only real progress towards the increase and diffusion of knowledge, but also visible and palpable progress. The public could see all the while where the money went, and could know that its representative in property was ever in possession of the Institution.

Mr. Pearce, the chairman of the present committee, also advocated the views of Mr. Choate, whose object he understood to be "to establish a great National Library, worthy of the nation and the age, and commensurate with the munificent purposes and donation of Mr. Smithson. Such a library should not be limited to works of science and art, or composed chiefly of such works. It should comprehend every department of learning, and all works of any value in every department, giving preference to no one branch of knowledge, but being ample and abundant in all. It should furnish to every citizen of the United States, and all who may visit it, an opportunity of prosecuting to the uttermost every inquiry. It should supply every source of information, and give the poorest student as ample means as are possessed by any man in Europe to gratify his literary curiosity, to follow out any reasonable inquiry, and to fathom the most intricate question, whether in history, philosophy, science, or art." Mr. Pearce showed that the Library of Congress could not meet this want, that it is necessarily so managed as not to answer all the objects of a national establishment, and that it would be quite inadequate for the purpose. "The libraries of the departments and of Congress could not with due regard to the interests of national legislation be transferred for public use as a national library."

Mr. Pearce stated the question distinctly: "it was to make the interest of this munificent bequest accomplish the injunction of the donor by such an increase and diffusion of knowledge among men as a complete national library, worthy of him and this country, *would undoubtedly insure.*"

In the House of Representatives, Mr. Marsh, of Vermont, was the leading advocate of the library plan, and it was in accordance with his

suggestions that the bill received its present shape, as we have already seen.

He says: "Of the various instrumentalities recommended by this noble and imposing scheme, the simplest and most efficient, both as it respects the increase and the diffusion of knowledge, is, in my judgment, the provision for collecting for public use a library, a museum, and a gallery of art; and I should personally much prefer, that for a reasonable period the entire income of the fund should be expended in carrying out this branch of the plan." And again: "I should prefer the appropriation of the entire income of the fund for one generation—three times as long as it has now lain idle—to the purpose of founding such a library as the world has not yet seen."

The library which he proposed to Congress was not such an one as could be collected, at the rate of 12,000 volumes and 8,000 pamphlets and parts of volumes in seven years. This he would not consider, as the committee do, "a very good beginning according to the plan for the *gradual* formation of a library, which the act points out." A library accumulating at the rate of 1,714 volumes and 1,143 pamphlets and parts of volumes a year, is not the library which he proposed to Congress, and for which he induced Congress to raise the annual appropriation from $10,000, reported by the committee, to $25,000, named in the present charter. He drew his illustrations of the kind of library which was wanted from the great libraries of Europe, ranging from 200,000 to half a million or perhaps even 750,000 volumes. He contrasted such a means of increasing and diffusing knowledge with the proposed means of research and experiment. He showed, by elaborate arguments, that a large library is the most efficient means of increasing as well as of diffusing knowledge—the means most wanted in this country. He showed, too, that this place was the fittest for such an establishment, and that it was in peculiar consonance with the spirit of the bequest.

On the other hand, it was contended by those who opposed the library, particularly by Mr. Niles, of Connecticut, and Mr. Owen, of Indiana, that the library would not meet the purposes of Mr. Smithson; that it would not increase or diffuse knowledge; that a great accumulation of books was not desirable to develop great minds; that a library would be local in its benefits; that Smithson did not mean a great library, or he would have said so. Something was said, too, about the "chaff of learned dullness," &c., as is done in the report of the committee.

In short, most of the considerations which the committee have presented, were, in substance, urged before Congress, and many of them with greater amplitude of argument and illustration; but they did not prevail to change the determination of Congress. In opposition to them, and in full appreciation of them, Congress adopted the Library plan.

These undeniable facts show that the manner in which the committee refer to the Library plan, as "the plan which was discussed seven years ago, but which is now revived," is far from being an exact statement of the case. It was a plan deliberately proposed in the Senate more than nine years ago, there discussed fully and openly, there deliberately adopted; a plan which, after it had been more than a year

before the public for open discussion and consideration, was distinctly brought before the House of Representatives, there again advocated, there again opposed most vigorously and elaborately, there again crowned with success, and established by both Houses of Congress as the first and principal purpose of the Institution. The manner of the allusion of the committee would lead one to suppose that the Library plan had never been broached or discussed till after the act of Congress had been passed, (eight years ago next month,) and that it was then proposed for the purpose of "either abandoning the active operations of research and publications, or so restricting this means of increasing and diffusing knowledge as to deprive it of all sensible value."

We shall hereafter see that the discussion which took place seven years ago was in the Board of Regents, or in committees, for the purpose of obtaining a foot-hold for the rejected and abandoned, but still restless and struggling project of researches and publications. It was not a discussion to dispossess "active operations," but to admit them. It was not a discussion before Congress, who alone had the power to admit or reject projects, but before the Board of Regents, whose sole duty it was "to conduct the business" of the Institution, shaped by Congress. Its purpose was to dispossess the library, or so restrict *its* means as to deprive *it* "of all sensible value."

We come now to the act of Congress itself. If, in this, Congress has failed to establish the Library plan, it cannot be doubted, by any one who has read the foregoing statements, that they have strangely failed to express their purpose.

But they have not failed. The law is in itself sufficiently clear and explicit.

In reference to this act the first question that arises is: Did Congress prescribe the purposes of the Institution—the instrumentalities and means which it was to employ for the increase and diffusion of knowledge among men; or did it create a board of management and confide to their discretion the selection of purposes, means, instrumentalities?

The committee expressly maintain that in this particular, Congress entrusted "a large discretion" to the Board of Regents; and the argument by which they endeavor to establish this position, if it proves anything, shows that Congress entrusted *all* to the Regents.

And here it is necessary to notice the distinction between the expressions, "the purpose of the testator," and the "purposes provided" by Congress for the Institution.

The distinction may be clearly seen in the phraseology of the ninth section of the act, where the Regents are authorized to dispose of "*other* moneys," "not herein appropriated or not required for the *purposes herein provided*," in such manner "as they shall deem best suited for the promotion of the *purpose of the testator*."

The "*purpose of the testator*" was his design, the end which he had in view, namely: to found at Washington an establishment for the increase and diffusion of knowledge—or, more generally, "the increase and diffusion of knowledge."

The "*purposes herein provided*" are the objects, means and instrumen-

talities provided by Congress, and specified in the act, for giving effect to the purpose of the testator.

If these expressions were used in these senses alone, it would promote clearness of idea, and we should know what is meant when *purpose* or *purposes* are spoken of.

The committee use certain other expressions; as, "the purpose of the Institution," which they define to be identical with the purpose of the testator; the "purposes for which the Institution was endowed and established;" the "purposes of the trust;" the "purposes specified in the will of Smithson;" and the "purposes specified in the act"—all of which they seem to use interchangeably, and in a way to imply their entire equivalency.

Thus in the following expression, near the beginning of the report: "The distribution and application of the Smithsonian income should be made, so as to answer most effectually and beneficially the *purposes* for which the Institution was endowed and established."

Now, what are these *purposes?* Are they, or are they not, the same as the *purposes provided* in the act as mentioned in the ninth section?

The report cautiously avoids this question, and goes on to assert that "the *purpose of the Institution* is disclosed in the title of the act, in its preamble and in its first section," in each of which it is expressly stated to be "for the increase and diffusion of knowledge among men." These are the identical words of Smithson's will; and thus the *purpose* of the Institution and the *purpose* of the testator, and the *purposes* for which the Institution is endowed, are made to appear to be used interchangeably, as equivalent, convertible terms.

So in another place we read: "The increase and diffusion of knowledge among men are the great *purposes* of this munificent trust." And immediately after, "neither of these *purposes* could be accomplished or materially advanced by the accumulation of a great library at the city of Washington."

In referring to the library, museum, gallery of art, laboratory, and lecture-rooms, the committee appear to be very careful not to identify them with the "*purposes provided*" of the ninth section. They call them certain instrumentalities for the purposes specified in the will—"certain means and instrumentalities by which the Institution is to execute the trust," "objects specified in the fifth section," &c.

The report leaves to be inferred, (if it does not studiously and skilfully endeavor to convey,) the impression that the *purposes* specified in the act are simply and solely the "great *purposes* of the trust," to increase and to diffuse knowledge; that the purposes specified in the act are specified nowhere *but* in the title, in the preamble, and in the first section, where the only specification is, and is declared to be, "the increase and diffusion of knowledge."

Now, why is this, but to give force and point to the argument that the library, in the estimation of the committee, not being for the increase and diffusion of knowledge among men, is not included among the *purposes provided* in the act, but is merely one of the indications of instrumentalities for effecting the *purposes* provided, which the Regents are not, perhaps, at liberty wholly "to disregard," but may, in the exercise of their "*large discretion*," postpone to any other instru-

mentalities which they may think to be promotive of the purpose of the testator?

Now, the question to be clearly stated, and which must be settled before we can proceed with this argument, is: are the *purposes provided*, which are mentioned in the ninth section, the same (as the whole drift of the report seems to indicate) with what is disclosed to be the *purpose* of the Institution, in the title, preamble and first section; or are these *purposes provided* to be sought for elsewhere in the act?

If these *purposes provided*, of the ninth section, are identical with, and nothing beyond, the *purpose* disclosed in the title, preamble and first section, and the purpose thus disclosed is simply "the increase and diffusion of knowledge," see what follows.

By authority conferred in the ninth section, the Board of Regents may dispose of "other moneys not required for the *purposes herein provided*," "as they shall deem best suited for the promotion of the purpose of the testator."

Now, in this sentence, substitute for the expression "*purposes herein provided*," the expression which the committee seem to labor to show is its precise equivalent and nothing more, namely, "the increase and diffusion of knowledge," and in the latter clause substitute for the expression "*purpose of the testator*," its equivalent in his own words, the section will then read thus:

The Board of Regents may dispose of any other moneys not required for the increase and the diffusion of knowledge, in such manner as they shall deem best suited to promote the increase and diffusion of knowledge.

We are led, then, irresistibly to the conclusion that the *purposes provided*, of the ninth section, are not disclosed in the title, preamble and first section, but that they exist, and are to be sought for, elsewhere in the act.

Now what are they, and where are they to be found? What are the purposes provided?

The first four sections of the act provide for the organization of the visitorial and executive authorities of the Institution; the investment of the funds; and the selection of a site for the building. In the remainder of the act are to be found the purposes which this organization is to administer.

The fifth section enacts: "That, so soon as the Board of Regents shall have selected the said site, they shall cause to be erected a suitable building, of plain and durable materials and structure, without unnecessary ornament, and of sufficient size, and with suitable rooms, or halls, for the reception and arrangement, upon a liberal scale, of objects of natural history, including a geological and mineralogical cabinet; also a chemical laboratory, a library, a gallery of art, and the necessary lecture-rooms."

The sixth section enacts: "That, in proportion as suitable arrangements can be made for their reception, all objects of art and of foreign and curious research, and all objects of natural history, plants, and geological and mineralogical specimens belonging, or hereafter to belong, to the United States, which may be in the city of Washington, in whosesoever custody the same may be, shall be delivered to such persons as may be authorized by the Board of Regents to receive them, and shall

be arranged in such order, and so classed, as best to facilitate the examination and study of them, in the building so as aforesaid to be erected for the Institution; and the Regents of said Institution shall afterwards, as new specimens in natural history, geology, or mineralogy, may be obtained for the museum of the Institution, by exchanges of duplicate specimens belonging to the Institution, (which they are hereby authorized to make,) or by donation, which they may receive, or otherwise, cause such new specimens to be also appropriately classed and arranged. And the minerals, books, manuscripts, and other property of James Smithson, which have been received by the government of the United States, and are now placed in the Department of State, shall be removed to said Institution, and shall be preserved separate and apart from other property of the Institution."

Section eight enacts: "And the said Regents shall make, from the interest of said fund, an appropriation, not exceeding an average of twenty-five thousand dollars annually, for the gradual formation of a library composed of valuable works pertaining to all departments of human knowledge."

Section ten gives to the Institution, for the benefit of its library, one copy of every book or other article for which a copyright may be obtained.

Congress provided, then, certain purposes. These are:

Objects of Natural History; a Chemical Laboratory; a Library; a Gallery of Art; Lecture-rooms.

Such, so much, and no more, did Congresss provide as the purposes of the Institution; the general design, scope, commission or *purpose* of which, is faithfully to carry into operation the plan which the act in execution of the trust confided to the government of the United States has prescribed. This trust is not transferred. Congress has put its authoritative construction upon the will of Smithson, and, in this respect, has left nothing to the discretion of the Institution, until these purposes be fulfilled.

We thus see that Congress did provide purposes—instrumentalities, and what they are.

Our next questions are:

How much discretion does the act give to the Regents, in respect to these purposes?

Does it allow the Regents to discard any or all of them?

Does it leave it absolutely to the discretion of the Regents to fix the scale upon which they shall be relatively provided for, or does it in itself indicate the scale?

The report maintains that Congress has not "in any manner indicated that prominence should be given to any particular means or instrumentality." "All this they have left to the discretion of the Regents;" and it asserts that Congress entrusted to the Board of Regents the discretionary power as to "what disposition they will make of so much of the income *as they do not think requisite* to apply to these objects," [namely, library. museum, laboratory, lectures, &c.]

It is to be supposed that no one will doubt the justice and propriety of the doctrine promulgated by the first Chancellor of the Institution, in the following language: "It is the first duty of the Regents to obey

the unequivocal behests of Congress—to carry them out faithfully, on the scale and in the spirit they obviously import; and to let their measures flow, not from their own discretion, but from the provisions of the law which they are empowered to execute."

Now what are the scale, the spirit, the provisions of the law?

The ninth section gives discretion to the Regents to employ "*other moneys, not herein appropriated, or not required for the purposes herein provided.*"

With reference to moneys that *are* herein appropriated, or required for purposes herein provided, it does not give discretionary power; and by not giving it, withholds it.

Moneys that *are* herein appropriated or required for the purposes herein provided are to be expended according to the provisions of the law, on the scale, and in the spirit, which Congress manifestly intended—not on the scale or in the spirit which the Regents *may think requisite.*

The law says, without qualification, "required;" implying that the scale of requirement is indicated in the act, as we shall see that it is.

In the first place, these objects are to be provided for "upon a liberal scale." This is a relative term, and to be interpreted according to the circumstances of the Institution, and other indications of the act. A library of 12,000 volumes might be on a liberal scale for a country college, but very meagre for a national library. Everything here must be provided for on a scale commensurate with the munificence of the bequest, the dignity of the trustees, the requirements for an institution under national control—on which all eyes are fixed, and in which nothing paltry is looked for.

In looking through the act, we shall find that the only two objects for which Congress expressed definitely and decidedly the scale upon which they should be provided for are the museum and the library. These must be provided for on an indicated scale, and the other objects must take what is left.

To the museum are given "all objects of art and of foreign and curious research, and all objects of natural history, belonging or hereafter to belong to the United States." This indicates that the museum was to be a large one—a prominent object.

To the library is given one copy of all copyright works; and the eighth section enacts that "*the Regents shall make from the interest of said fund an appropriation not exceeding an average of* $25,000 *annually for the gradual formation of a library.*"

The whole income of the fund was about $30,000, of which the Regents are authorized to expend $25,000 a year for a library.

It should be observed, that for the other purposes provided no direct appropriation is made or commanded. In this respect the library stands by itself, alone, in distinct and emphatic prominence. An appropriation for the library is mandatory, though the amount of it is not absolutely fixed. No appropriation is required to be made for lectures, for a chemical laboratory, or even for a museum. Lecture-rooms were to be provided, to be used as the means of the institution might allow, or as circumstances might determine. A chemical laboratory was to be provided, but no appropriation was made for its maintenance. It

may have been the intention of Congress that it should be (as it has been) merely an auxiliary to the lecture-room, or for uses not requiring appropriations. Once properly built, and fitted up, it might, if the Regents had thought proper, doubtless have been placed at the disposition of a competent chemist, who could have established a great chemical school, which would need no help from the funds of the institution, but might, on the contrary, be made a source of revenue.

No appropriation is commanded or directly authorized for the purchase for the museum of articles of natural history and works of art. These are to be supplied from the collections of the government and from donation and exchange.

The only object, we repeat, for which the expenditure of money (except for mere custody) is directly prescribed in the act, is the *library*; and for that, the Regents are authorized to expend five-sixths of the whole income. The remaining sixth, it was supposed, and justly, might be sufficient to provide lectures, and suitable custody for the objects of natural history, and works of art. But, inasmuch as one-sixth might not prove to be sufficient for this purpose, the full sum of $25,000 a year was not absolutely required to be expended.

Now, with what reason can it be said, as the committee have said in their report, that Congress have not "in any manner indicated that prominence should be given to any particular means or instrumentality for increasing and diffusing knowledge?" Congress certainly did give prominence to the library.

The fact that Congress did not require any appropriation for other purposes, and that they placed so high the limitation for the library, for which alone they did require an annual appropriation, is a very strong, forcible, and unmistakable indication of their will to give it prominence.

That the fixing a maximum of $25,000 as the *average* annual expenditure on the library, is an intimation of the proportion which Congress intended should be expended upon the library, it scarcely seems possible for any reasonable man to deny.

If Congress, instead of saying "not exceeding an average of $25,000 annually" for a library, had said not less than $1,710 annually, (the average sum actually expended for books thus far,) could it not fairly have been urged that Congress did not intend that $25,000 should annually be expended? If Congress having required not less than $1,710 to be expended for books, and established other purposes which required for carrying them out on a liberal scale $25,000 a year, the advocates of the library had urged that this minimum was "nothing but a limitation upon the discretion of the Regents, and can by no rule of construction be considered as intimating" that $25,000 should not be annually appropriated for books, would the argument have been considered a fair one on the part of the advocates of the library?

The report asserts that the provision of the act contained in the 8th section, that the Regents "shall make an appropriation, not exceeding an average of $25,000 annually, for the gradual formation of a library," is not mandatory; and, if it had been so, "would have made the general authority and discretion given to the Regents in the 9th section absurd and nugatory, and would indeed have equally defeated the other provisions before mentioned."

This conclusion may be admitted as legitimate and necessary. In the sense in which the 9th section appears to be taken in the report, and in the light in which "the other provisions before mentioned" are there regarded, a requirement to expend the whole of the income not absorbed in salaries, repairs, and current expenses, upon the objects expressed to be the purposes of the act, would have left all "active operations and contributions to knowledge" without means, and the 9th section without occasion of application in such sense.

But if not mandatory—which is not, however, admitted—it, without question, is permissive. It empowers an expenditure for the library alone, which would leave nothing beyond the necessary expenses of the Institution.

If, instead of agreeing to the resolutions called the compromise, the Regents had appropriated $25,000 annually for the gradual formation of a library, as, beyond all question, they had a legal power to do, the provisions of that compromise would have fallen as completely within the category of defeat, and the 9th section, as the report construes it, into that of absurdity and nugatoriness.

By the interpretation which the report applies, the act confers a power upon the Regents to render one of its provisions, and that one the most important in the sense imputed to it, absurd and nugatory. But if the act gives a power, by the exercise of which any plan or part of a plan of operations would be rendered impossible, a very strong probability may be inferred, particularly in the absence of any expression of such a purpose, that such plan and operations did not enter into the scope of the intentions of the legislator.

If the provision which relates to the appropriation for a library be mandatory, the occasion would indeed be less likely to occur for the application of the 9th section. But that section would not thereby become absurd or nugatory in any other manner or degree than the exercise of the power granted by that provision, considered as merely permissive, would render it.

The statement of the committee that "Congress could not but know that an appropriation of five-sixths of the amount [30,000] per annum would leave a remainder entirely insufficient to defray the salaries and ordinary expenses of an institution such as was designed by the act," is equally untenable.

The only other purposes provided are a museum, lecture-rooms, and a laboratory. The first is the only one of these for which annual appropriations are needed, and those not for purchases, but for care and salaries. Three or four thousand dollars might well be supposed to be sufficient for this purpose. Not more than one thousand dollars, on an average, has thus far been expended each year for lectures. Upon the chemical laboratory it may not have been thought necessary to expend anything directly beyond what was necessary for its erection and the furnishing of it. Nothing beyond this has been, thus far, expended. The salaries of librarian, assistants, and messengers for the library, would of course be paid from the appropriation for the library. No other officer is required except the secretary, who it was intended should perform the duties of both offices, and receive but one salary.

The great expenses which have been incurred under the head of general expenses were never contemplated in the act, nor would they have been incurred had the Institution been made as Congress intended, almost entirely a library.

It seems impossible, therefore, to doubt that Congress, in the charter of the Institution, intended:

1. To designate the means to be employed in effecting the purpose of the testator; which means, so designated, they call the "purposes" of the act.

2. To indicate that the library should be the principal one of these purposes, and should receive about twenty-five thousand dollars a year, and that the Museum, Laboratory, and Lectures should receive only about $6,000 a year.

3. To exclude all other objects from a share in the funds of the Institution till these purposes had been provided for on the above-mentioned scale.

4. To provide that, if by any means there should be a surplus of income after the purposes had been provided for on the scale indicated in the act, the Regents might dispose of such surplus in such manner as they might think most promotive of the purpose of the testator.

There might never be such surplus. In that case this clause of the act would remain inoperative, as the clause providing that Congress may alter or amend the charter has thus far remained, and may forever remain, inoperative. Still there might be such a surplus. It is easy to conceive how such a surplus might accrue. The accumulated interest appropriated for the building might not be all required for that purpose. Congress might provide a separate maintenance for the Museum. A revenue might arise from the Chemical Laboratory. These are supposable cases in which such "*other moneys*" might accrue. If they did accrue, this provision is made that such "other moneys" might not lie idle.

Now, in opposition to all this, the committee make of the ninth section, which gives authority to dispose of "other moneys" not herein appropriated, or not required for the purposes herein provided, the principal section of the act conferring upon the Board "plenary power," a "large discretion," allowing them to reduce to mere nothing the purposes provided, to bring in other purposes not provided in the act, and to install these other purposes as of paramount importance. A precautionary clause, inserted to provide for a possible contingency, is made to override the whole act, to change its entire character, to place last what Congress placed first, to place first what Congress did not name at all, but formally and repeatedly, by positive votes, rejected.

The committee argue mainly, that, for various reasons, it would be absurd and preposterous to suppose that the act means what we have shown that it must mean.

The "*reductio ad absurdum*," however, of which argument the committee have made so large use in their report, does not carry with it conviction to the minds of good reasoners, unless the resulting absurdity be palpable and indisputable.

In the present case there is no intrinsic absurdity in the alternatives presented by the committee. Apparent incongruities there may be in

the charter, but all of them easily traceable to well-known facts in the history of the act, and in no way calculated to affect our judgment as to the intention of the legislature.

The inapplicability of this mode of reasoning for the present purpose may be shown from a few illustrations.

The act which passed the Senate on the 23d of January, 1845, as we have already seen, beyond all possibility of doubt, did establish a library as the principal and paramount object of the Institution. It required *not less than* $20,000 a year to be expended for that purpose.

The title of that act is *totidem verbis* the same, and the preamble is essentially the same as those of the present charter; yet the committee assert that the title and preamble of the charter would have been palpably absurd, "if their object had been only or chiefly to found a great library."

The Senate assert, by vote, that "an ample and well selected public library constitutes one of the most permanent, constant, and effectual means of increasing and diffusing knowledge among men." But the committee say, "to describe a library as an Institution for the increase and diffusion of knowledge among men, would be a preposterous abuse of terms."

The Senate bill required "to be erected a suitable building of plain and durable materials and structure, and fire-proof, without unnecessary ornament, and of sufficient size to contain, in a convenient arrangement, a library of the first class of the public libraries now in the world, and with suitable rooms, or halls, for the reception and arrangement, upon a liberal scale, of objects of natural history, a geological and mineralogical cabinet, a chemical laboratory, and a lecture-room or rooms."

But the committee say: "so, too, to erect a building of sufficient size, with suitable rooms or halls, for the reception and arrangement, upon a liberal scale, of objects of natural history, geological, mineralogical, and botanical specimens, classed and arranged so as to facilitate the study of them, with a chemical laboratory, lecture-rooms, &c., as provided in sections 5 and 6, is wholly inconsistent with the idea of an Institution, of which a library is to be a principal agent."

The ninth section of the present act is to be found in the Senate bill, which required not less than twenty thousand a year for the library, and included, besides the library, more objects, and rendered necessary greater expenditures for other objects, than the present act.

Yet the committee say with reference to the clause of the 8th section, authorizing an application of an annual sum, not exceeding $25,000, for the gradual formation of a library: "This is in great disproportion to the various objects before recited in the act, and if it had been mandatory, would have made the general authority and discretion given to the Regents in the ninth section absurd and nugatory."

It is unnecessary to pursue this comparison. The bill that passed the Senate, which positively required the library to be the paramount object, was in all its essential features similar to our present charter.

The theory of the committee that the 9th section "appears to have been intended to give the Regents the authority to reconcile and determine those difficulties which Congress could not avoid or provide for, to their own satisfaction;" that it "appears to indicate a consciousness

on the part of the framers of the bill, that its provisions might be proved by experience to be incongruous;" and that "for this they provided the true remedy by investing the Regents with full power to use their judgment in the premises;"—this theory is wholly gratuitous and irreconcilable with facts in the history of this section.

There is nothing really incongruous in the various provisions of the bill, understood according to their plain signification unembarrassed by the views of the committee respecting the 9th section. Therefore the theory is gratuitous, unnecessary.

This clause was first introduced into Congress in a bill providing for the appropriation of the whole income of the Smithsonian fund, so far as known, to one single purpose, the founding of an Astronomical Observatory. There were no incongruities to be reconciled. The Institution was "a unit." The bills for the Smithsonian Institution successively introduced into Congress were, for the most part, copied one from another, with variations to suit the purposes to which the proposers of the bills wished to direct the appropriations. This section was almost always retained. It was in the Senate bill which made the Institution mostly a library. It was in Mr. Owen's bill as originally presented. It was evidently taken, on all hands, to be what it purports to be, a saving clause providing for a possible contingency.

One fact should be distinctly noticed with respect to this act of Congress; namely, that it was not originally designed to create an institution in which the library should be the principal thing. It was intended for a very different purpose, and was amended, modified, and formed, so as to effect, as was supposed, this particular purpose. It is impossible to say what might have been the exact form of organization, and the phraseology of different sections, had the design of those who first framed the act been the same as the design of Congress in its final passage. The amendments were made in the haste of legislation. Nothing was left in the bill which was *supposed to be*, or which, in reality, is inconsistent with the creation of an institution, in which the library is the principal object. The act might or might not have been different, had this been the design of its *first* framers. But whatever we may suppose, we must take it as it is, and see what it plainly means. Any apparent incongruities are readily accounted for, by the knowledge of the fact that this is an act originally intended for a different purpose, but modified and amended into its present shape.

Thus, when the committee allude to the order in which the library is included among the other objects not first, but *after* other objects, it should be remembered that this section was prepared for an institution in which the appropriation for the library was limited to $5,000 a year. It was retained when this appropriation was raised to a limitation of $25,000 a year; because, as we may well suppose, the order of enumeration could be a matter of no consequence whatever. It would not overrule or modify the relative position of the library among other objects, as established by other parts of the act.

So, too, with reference to section 7, respecting the officers of the Institution. The committee say that, had Congress intended to make the library the chief object, "instead of a secretary, with assistants, it

should have provided for a librarian, with an assistant as secretary, and assistant librarians."

What it *should have done* is of less importance to us than what it *has done*. What it has done, in this particular, is not incongruous with other provisions of the act, and can be more aptly construed in conformity with the requirement inferred by the committee than with the conclusions of the "committee of organization" respecting the office, as they remodelled it.

There must be a secretary of the Board of Regents. As such, he is required to take charge of the building and property of the Institution, and to keep a record of its proceedings, and, in connexion with the chancellor, to certify drafts for money. No other duties are assigned to the secretary by the act, or in any way intimated to be expected from him as secretary. Now, it is manifest that these duties alone are not sufficient to occupy the time of an officer; that they may be properly connected with other duties. Congress, therefore, required the same officer to discharge the duties of secretary, librarian, and keeper of the museum; the secretarial duties giving name to his office, though not requiring so much of his time as his other duties. The reason of the designation of the office as that of secretary, instead of librarian or curator, is obvious, for he is secretary of the Board of Regents—an officer of the Board as well as of the Institution. The name of the office might well be supposed to be a matter of no consequence.

There is no intrinsic absurdity in requiring a librarian to be also a secretary, nor in calling him either secretary or librarian. There is nothing absurd in his taking his legal title and designation from the duties of secretary instead of from those of librarian, though the former should be, so far as the qualifications for their fulfilment and the time employed upon them, much less important than the latter. So the legal title and designation of the librarian of the Smithsonian Institution was intended by Congress to be secretary; as the title and designation of the librarian of the Astor Library is superintendent, and of the Library of the British Museum keeper of the printed books.

Here, again, should we trace the history of the phraseology of this section from bill to bill, the result would be a complete refutation of the notion of the committee.

This section, after having been introduced in different forms into various bills, was inserted, in its present form, into Mr. Hough's bill, which did not provide primarily for a library, but limited the appropriation for a library to $5,000 a year. After the amendments were made to give paramount importance to the library, this 7th section was not altered, because it was not supposed to be inconsistent with the prominence of the library; nor is it.

There is no incongruity between this section and the rest of the act. The incongruity which does exist, shows itself between the act of Congress and the following resolution of the Board of Regents proposed by the committee of organization:

"*Resolved*, That it is essential for the advancement of the proper interest of the trusts, that the Secretary of the Smithsonian Institution be a man possessing weight of character and a high grade of talent; and that it is further desirable that he possess eminent scientific and general acquirements; that he be a man capable of advancing science and promoting letters by original research and effort, well qualified to act as a respected channel of communication be-

tween the Institution and scientific and literary individuals and societies in this and foreign countries; and, in a word, a man worthy to represent, before the world of science and of letters, the Institution over which this Board presides."

This resolution seems to mark out for the secretary an entirely different set of duties from those enumerated in the act of Congress. The qualifications are not those likely to be specified as needed for a librarian; but they are precisely what would be needed for a secretary of such an institution as the organization committee wished to make, not such an institution as Congress did make or command to be made.

The report in which the above-quoted resolution is presented, after enumerating even higher qualifications as essential than those expressed in the resolution, adds, as the opinion of the committee, that—

"Upon the choice of this single officer, more probably than on any one other act of the Board, will depend the future good name, and success, and usefulness of the Smithsonian Institution."

Now, if, in the "election of a suitable person as secretary," the Board of Regents have had the happiness to direct their choice upon a first incumbent of that office uniting in himself the several eminent qualifications they thus designate to be "essential," their success, in this instance, affords no appreciable guarantee that all or any of his successors shall be so completely furnished. Such men, and so endowed, are not at all times nor readily available. A single failure would, in the opinion of the committee, be fatal to the reputation and usefulness of the Institution.

The reason upon which this opinion of the committee, and the resolution itself, are stated to be founded, is this:

"The charter," says the report of the Committee on Organization, "seems to have intended that he (the secretary) should occupy a very responsible position; granting, as it does, to the secretary, in conjunction with the chancellor, the power to determine the necessity and the amount of appropriations for the purposes of the Institution."

The inference of the committee, from such an intention, even were the intention as apparent as the committee assert, is by no means a necessary one, if other parts of the act be considered in connection.

But the act contains no such words. It grants no such power. It requires, indeed, that the chancellor and secretary shall examine and certify the money requisitions of the Board of Regents, or of the Executive Committee, to the proper officer of the treasury for payment. The provision adds, "if they approve thereof." This condition of the approval of the chancellor may indeed be of some significance, inasmuch as he may rightfully exercise a scrutiny beyond the mere clerical accuracy and correctness of the requisitions; but no authority, no controlling judgment is conferred upon the secretary, whose function is merely ministerial, who is removable at the pleasure of the Board of Regents, and whose discharge of this certificative duty neither implies nor affects any "*responsibility*" beyond that which is inferred by his relation to the Board.

This point leads me to consider the course of the Institution after it had come under the care of the Regents.

The first meeting of the Board was held on the 7th, 8th and 9th of September, 1846.

At this meeting two committees were appointed by resolution, as follows:

"*Resolved*, That a committee of three be appointed by the Chancellor, from the members of the Board, to digest a plan to carry out the provisions of the act to establish the Smithsonian Institution, and that they report the same to the next meeting of the Board.

"Whereupon, the Chancellor appointed Mr. Owen, Mr. Hilliard, and Mr. Bache said committee.

"To this committee, Mr. Choate and Mr. Pennybacker were subsequently added.

"The following preamble and resolutions were offered and agreed to:

"Whereas the act to establish the Smithsonian Institution prescribes an appropriation, not exceeding an average of twenty-five thousand dollars annually, for the gradual formation of a library, composed of valuable works pertaining to all departments of human knowledge: Therefore,

"*Resolved*, That a committee of three be appointed, to prepare a report upon the subject of the formation of such a library, indicating its general character, and the modes of proceeding to accumulate it, and to present such report at the next regular meeting of the Board.

"Whereupon, the Chancellor appointed Mr. Choate, Mr. Hawley, and Mr. Rush, said committee."

These committees reported at the adjourned meeting of the Board, which commenced on the 30th November, 1846.

The report of the Organization Committee, as first presented on the 1st of December, 1846, while it named the library *first* among the objects provided for by the act of Congress, and recommended that $20,000 "for the present" be appropriated to the library, to begin from January, 1848, and that a library-room should be provided sufficient to receive not less than 100,000 volumes, and capable of extension,—while it proposed measures for rendering the museum extensive and valuable, and recommended providing a room for it not less than about 250 feet by 50,—while it recommended the fitting up of a laboratory, and three lecture-rooms, all in fulfilment of the design of Congress, went on to propose other plans, which not only were not authorized in the act, but had been stricken out of it by direct and decisive votes, and which it would be totally impossible to establish upon the income of the fund, after providing for the other purposes which the committee recommended, on the scale which they seemed to approve.

They recommended the appointment of a professor of chemistry, capable of lecturing and of making original researches in that science; and they thought it might also be necessary to employ a professor of natural philosophy; and expressed an opinion favorable to the appointment of professors or lecturers on zoology, geology, mineralogy, and botany, to be organized into a faculty.

The appointment of professors and lecturers they recommended, notwithstanding that the same matter proposed to the House of Representatives had been rejected on the 29th April, first by a vote of 72 to 42, and afterwards, when modified, by a vote of 77 to 42. This plan was rejected in different forms three times in one day.

The committee also recommended particular attention by lectures and publications to common school instruction. This, also, when proposed in the House of Representatives, had been rejected by the most decisive votes.

They recommended that a portion of the grounds of the Institution be laid out as a botanical garden, and another portion reserved for a small experimental farm. They further recommended the publication of lectures, brief tracts or periodicals.

The chairman of the committee had been the author and chief advocate in Congress of these provisions, which were stricken out of the bill.

But, although these recommendations for reinstating plans rejected by Congress were contained in the report of the Organization Committee, they were not acted on by the Board. The report, on motion of the chairman, was on the 21st December, 1846, recommitted. On the 25th of January it was again presented in an amended form. Of this new form of the report we shall speak hereafter.

The report of the Library Committee was presented on the 3d of December, 1846—two days after that of the Organization Committee. This report was accompanied by resolutions which were adopted on the 4th of December. In it the committee say:

"They see in the language of the act, which the Regents are created to administer, and in the history of the passage of that act, a clear intimation that such a library was regarded by Congress as prominent among the more important means of increasing and diffusing knowledge among men. This intimation they think should control, in a great degree, the acts of the Regents. They will not, however, withhold the expression, that the apparent policy of Congress in this particular is marked by profound wisdom; that it rests on a right construction of the terms and an enlarged appreciation of the spirit of the bequest; that it points out a mode of administering a considerable portion of the annual income of the fund which involves no danger, or little comparative danger, of waste or mismanagement or perversion into jobs and sinecures; which, instead of dissipating it imperceptibly and irrecoverably, will embody it in visible, permanent form, conspicuous among the spectacles of our civilization, sharing in and contributing to its perpetuity; which will supply the chief remaining want by which the increase and diffusion of knowledge in this country has been retarded and embarrassed—the want of accessible, adequate means of conducting independent investigations in all the fields of thought; which will ultimately secure to this nation the glory of containing within its capital the most various, the best chosen, the most instructive collection of the recorded history, the published thoughts and sentiments, the intellectual and imaginative achievement of all the races and ages of man (the true and indispensable materials of ethnology) to be found in the world. The act of Congress directs an annual appropriation to this object of not more than an average of twenty-five thousand dollars. Without pausing to inquire what precise average amount should be expended, the committee will say that they have become satisfied that there would be no difficulty in judiciously expending for a limited period, if it is otherwise desirable to do so, the entire sum indicated as the maximum in the act."

The committee in their report proceed to consider the character and extent of the library which it was the design of Congress to establish, referring for illustration to the largest of European libraries; the necessity of such a collection; and the way of selecting and procuring it.

In accordance with the recommendations of this committee, the Board passed the following resolutions:

"*Resolved*, That, for the present, out of the interest accruing to the Institution, the sum of twenty thousand dollars be, and the same is hereby, appropriated, for the purchase of books and the gradual fitting up of a library, and all other incidental expenses relating to the library, except the salaries of the librarian or librarians; the said appropriation to commence from the first of January, eighteen hundred and forty-eight.

"A motion was made by Mr. Hough that the same be amended, by striking out 'twenty thousand dollars,' and inserting '*twelve thousand dollars.*'

"Which motion was disagreed to.

"Mr. Rush moved that 'twenty thousand dollars' be stricken out, and '*fifteen thousand dollars*' inserted.

"Which motion was disagreed to.

"The question was then put,

"Will the Board agree to the resolution?

"And was decided in the affirmative.

"The following resolution was then read, and agreed to, viz:

"*Resolved*, That the portion of the building to be for the present set apart for a library be of sufficient capacity to contain not less than one hundred thousand volumes; and that it is desirable that the plan should be such as to render an extension practicable, if hereafter desired

"*Resolved*, That it be recommended to the secretary of the Smithsonian Institution, forthwith to employ, subject to the approval of the Board of Regents, an assistant secretary, well qualified to discharge the duties of librarian.

"*Resolved*, That a committee be appointed, in conjunction with the secretary, to prepare and submit to this Board, extended lists of books in the different departments of learning proper to be first purchased, according to the general principles of this report; and for this purpose, that they be authorized to request the aid of the librarian and of other persons competent to afford it, and to engage to such person the honor of the Board for discretionary remuneration of such aid.

"Mr. Choate, Mr. Hilliard, and Mr. Rush were appointed the said committee."

We have thus traced the history of the Library plan from its first proposal in the Senate of the United States, in January, 1845, to its full establishment, as was supposed, by the Board of Regents, in December, 1846.

We have seen that it was distinctly proposed, fully discussed and adopted in the Senate, in the most unequivocal manner; the expenditure of $20,000 a year for the library being mandatory.

We have seen that in the House of Representatives, after the plan had been more than a year before the public, it underwent a full discussion, and encountered the most vigorous opposition; that efforts were made to limit the annual appropriation to $5,000, to $10,000, to $20,000, but that the House would not consent to any limitation short of $25,000.

We have seen, that subsequently an effort was made in the Senate to restrict the annual appropriation of $25,000 to the first three years, and to make the limitation after the three years $10,000; and that this was not adopted.

We have seen that the discussion was re-opened in the Board of Regents, and that plans deliberately and decidedly discarded by Congress were proposed to be reinstated. After another discussion the library again triumphed. The adverse plans were not adopted. The appropriation for the library was fixed at $20,000, and measures were adopted to carry into effect the determination of the Board, in accordance with the intentions of Congress.

It was indeed to be hoped that the perils of the library were at an end; that the deliberate intentions of Congress would be executed; that the expectations of the public would be realized; that the anxiety of waiting and hoping scholars might be relieved. The discussion had been protracted. Argument in opposition had been exhausted. The decisions had been emphatic. The thing had not been done in a corner, but openly—before the world. Every possible opportunity had been given for the fairest and most ample consideration.

But all this was not enough. A new mode of attack was discovered—a new plan of action pursued, and this time with success.

On the 21st of December, 1846, more than two weeks after the adoption of the recommendations of the Library Committee, and three weeks after the first presentation of the report of the Organization Committee, this latter report was, on motion of the chairman, recommitted.

On the 25th of January, 1847, the chairman presented his amended report, in which new principles of action and a new plan of operations are propounded.

These are all founded upon a new reading of the charter.

Instead of saying, as at first, that the charter "either directly prescribes or sufficiently indicates certain items," they now find that the "charter indicates a few items," and that, "after enumerating these items, the framers of the charter added a clause of *plenary powers*, authorizing the Board, as to all funds not required for the above special purpose, to make of them "such disposal as they shall deem best suited for the promotion of the purpose of the testator."

They now discover that the Board are not expected to provide for the objects specified in the act, according to the proportions manifestly intended by Congress, but "*to such extent* as they [the Board] *may consider necessary* and *proper*;" and that having let their measures in this respect "flow from their own discretion," they may "dispose of the remaining funds annually accruing," as they shall deem best suited for the promotion of the purpose of the testator.

This was an entirely new principle of action, claiming in effect that Congress had not provided and defined the purposes of the Institution, but had left everything to the Regents. They could on this principle found a College, University, Theological School, Observatory, or give the money to the National Institute, or do anything else that they pleased with it; for no one of these objects had been more distinctly and emphatically repudiated by Congress, than those which in the exercise of their "*plenary power*" they proposed to adopt.

Surely, we should suppose that no proposition, thus radically subversive of what was the obvious and universally understood design of Congress, could be hastily adopted by the Board. Time will be allowed for full deliberation. The public will be informed of what is in contemplation. Wise interpreters of law will be consulted. The hermeneutics of common sense will be applied. A full Board will be summoned. The question will be explicitly stated. The consequences of the decision will not be disguised. The friends of the library will be allowed to rally once more for its defence. Congress will be permitted to know of the controversy. The decision—if the question of such a change be seriously entertained—will be taken cautiously and understandingly.

But, no! The report, as amended, was presented to the Board on the 25th of January, 1847, and on the *next day*, the 26th of January, 1847, the resolutions reported by the committee, embodying the results of the exercise of their discretion, were adopted.

The public and Congress knew nothing of this matter till the deed was done. There was no open discussion. There could have been but little discussion before the Board. The discussion that there was, must have been mostly before the committee, and in private, between individual members of the Board. The result was received with utter astonishment by all not in the secret of the movement.

But what, after all, did the committee propose in the exercise of the discretion thus assumed?

Why, plans which had been by Congress deliberately stricken out of the bill, on account of their being inconsistent with the plan of appropriating the fund first and principally to the library; and plans which had been in a variety of combinations and with varying phraseology, (while the substance was the same,) proposed to Congress and rejected.

In order to show at once to the eye how similar, even in phraseology, the plans of the committee are to propositions rejected by Congress, because of their inconsistency with the library plan, the two are here placed in parallel columns. In the first column are the resolutions reported by the committee and adopted by the Board. In the second column are passages from sections stricken out of the act:

"*Resolved*, That it is expedient, and demanded by the will of the testator, that in our plan of organization, the increase of knowledge by original research should form an essential feature."	"They [the Regents] shall also have special reference to the increase and extension of scientific knowledge generally, by experiment and research."
"That in furtherance of this object, premiums be offered at such times, and to such amounts, as the Board may hereafter decide, for original papers, containing positive additions to the sum of human knowledge."	"And may, at their discretion, offer and pay to any citizen or foreigner, such sum or prize as they may deem discreet for the best written production, &c."
"And that these, together with other suitable papers, be published in Transactions of the Institution, to be entitled 'Smithsonian Contributions to Knowledge,' and to be issued periodically or occasionally, in quarto form, as materials may be obtained."	"The Regents are authorized to publish 'treatises on history, natural and civil, chemistry, astronomy, or any other department of useful knowledge.'"
"*Resolved*, That it is within the strict purpose of the trust, and may materially advance its legitimate objects, occasionally to make specific appropriations for definite lines of research, the results to be published as above."	"And whereas knowledge may be essentially increased among men by instituting scientific researches, &c."
"*Resolved*, That with a view to the diffusion of knowledge, there may properly be included in the plan of organization the issuing of publications, in brief and popular form, on subjects of general interest." "*Resolved*, That with a similar object, there may also properly be included in the plan of organization the issuing of periodical reports, containing records of the progress of knowledge in its different branches."	"The Regents may 'cause to be printed and published, periodically or occasionally, pamphlets, magazines, or other brief works or productions, for the dissemination of information among the people, especially works in popular form,' &c."

But it would seem the committee were not unanimous. There were "two great conflicting opinions." And a member of the Committee on Organization submitted certain resolutions as a "compromise," which were adopted by the committee, and passed by the Board, as follows:

"*Resolved*, That for the purpose of carrying into effect the two principal modes of executing the act and trust pointed out in the resolutions herewith submitted, the permanent appropriations out of the accruing interest shall, so soon as the buildings are completed, be annually as follows; that is to say:

"*First*. For the formation of a library composed of valuable works pertaining to all departments of useful knowledge, and for the procuring, arranging, and preserving of the various collections of the Institution, as well of natural history and objects of foreign and curious research and of elegant art, as others, including salaries and all other general expenses connected with the same, excepting those of the first complete arrangement of all such collections and objects as now belong to the United States, in the museum of the Institution, when completed, together with one-half of the salary of the Secretary, the sum of fifteen thousand dollars.

"*Secondly*. For the preparation and publication of transactions, reports, and all other publications of the Institution, including appropriations for original researches and premiums for original papers; for the delivery of all lectures and payment of all lecturers; and for all general expenses connected with said lectures and publications, together with one-half of the salary

of the Secretary, the remainder of the annually accruing interest: it being understood that all general and incidental expenses not specially connected with either of the above two great divisions of the plan of the Institution shall be equally divided between them.

"*Resolved*, That it is the opinion and intention of the Board, that in the appropriation for the objects of the Institution of any surplus of accrued interest which may remain after the completion of the buildings of the Institution, an equal division shall be made between the two great branches; that is to say, one-half shall be appropriated to the library and museum fund, and the other half to the fund for original research, publications and lectures; and that in regard to all other funds hereafter to accrue to the Institution the same division be made."

The conflict, it would seem, was between the discretion proposed to be exercised by the Board of Regents, and the will of Congress expressed in the act; and concerned objects sought to be resuscitated under the new interpretation of the charter, and embodied in the resolutions already quoted, in substitution for those specified in the charter, as intended by Congress to receive all the income of the fund.

The views of those who advocated the first named objects are expressed in the resolutions already quoted in parallel columns with propositions rejected by Congress. The views of those who held to the design of Congress are contained in the following resolution:

"*Resolved*, That it is the intention of the act of Congress establishing the Institution, and in accordance with the design of Mr. Smithson, as expressed in his will, that one of the principal modes of executing the act and the trust, is the accumulation of collections of specimens and objects of natural history and of elegant art, and the gradual formation of a library of valuable works pertaining to all departments of human knowledge, to the end that a copious storehouse of materials of science, literature, and art, may be provided, which shall excite and diffuse the love of learning among men, and shall assist the original investigations and efforts of those who may devote themselves to the pursuit of any branch of knowledge."

These two sets of resolutions form the basis of the "*compromise*." It would seem from the fact that a compromise upon an equal division of the income was made, that each party claimed considerably more than half. Each must have yielded something of its pretensions, or it could not have been justly called a compromise.

The compromise was the first defeat of the Library plan; but not, as was to have been foreseen, the last. "*Plenary power*" and unlimited "*discretion*" are not likely to be satisfied with a partial triumph.

The committee had, it seems, adopted the resolution appropriating $20,000 for the library exclusive of salaries of librarians, and to commence in January, 1848, as "in accordance with the above plan of organization, [the compromise] and tending to carry out its details."

The compromise was to commence "so soon as the buildings are completed." In the mean time the $20,000, understood by the friends of the library to be an annual appropriation, was to be expended for books.

But the friends of the objects brought in under the new construction of the law wanted for these objects more money than could be given under the compromise, and for their purposes "no costly buildings or expensive permanent establishment," or large library, was needed.

The Executive Committee took the matter under consideration. The contract for the building had been made. The building itself was considerably advanced. Congress had appropriated the accrued interest, or so much as might be needed, to the building, and established the original bequest as a fund, the interest of which should be for the perpetual maintenance and support of the Institution. Not knowing but that the building might cost something more than the accrued interest,

Congress had, in another section, authorized the Board to pay towards the building "such sum or sums out of the annual interest accruing to the Institution as may, in any year, remain unexpended, after paying the current expenses of the Institution."

Under cover of this authority, such as it is, (but ample under the new exegesis,) the committee recommended that more than one half of the annual interest for five years should be expended on the building, (which should be five years in progress,) and that the expenditures for the objects of the Institution should, during this time, be limited to $15,000 a year. The committee proposed to save thus $15,000 of the accumulated interest, and to add the same to the principal, in order to produce, for all time after, an increased revenue to the Institution.

The committee argued that $15,000 a year would be, during that time, sufficient, "provided a considerable portion of the same be not annually expended in the purchase of books and collections." That is, in plain English, they are content with the half or even with a little less than the half of the whole income during five years, for the purpose of increasing the whole income after the five years, provided this increase can be procured by depriving the library of its portion of the income during the five years.

They did not propose (as is now done) to permanently deprive the library and collections of their part. Such a proposition was not to be made in advance. On the other hand, it was attempted to reconcile the friends of the library to the scheme, by urging that by its operation "the sum of a hundred and forty thousand dollars will be added to the original capital of the Institution; making an addition to its income of eight thousand four hundred dollars annually, forever; one half of which, by the resolutions hereinafter recited, commonly called the compromise resolutions, will inure to the benefit of the library." "The additional four thousand and two hundred dollars added by that plan annually, forever, to the library appropriation, is far more than an equivalent for the delay it presupposes, in the accumulation of works not wanted for immediate reference, or present purposes: *a delay extending only to the period when suitable arrangements can be made for their reception.*"

But, inasmuch as the compromise was not to take effect till the building was completed, how, it may be asked, could this scheme affect the library? Only through the $20,000 appropriation. This $20,000 had previously been declared to be in accordance with the plan of the compromise; the compromise being intended to operate *after* the five years, and this appropriation *in the mean time.* It was the $20,000 for the library which must be diminished. The committee did not directly propose to do this. They only repeated concerning it what the committee which originally adopted it had said relative to the kind of books which should be bought with it—"such valuable works of reference as in the prosecution of its plan may be required;" but the resolution appended to the report says this appropriation "shall be strictly construed to authorize only the purchase of such valuable works of reference *as the secretary, or the Building or Executive Committee,*

may consider useful for present purposes, or otherwise likely to be immediately demanded in the prosecution of the plan of the Institution."

It will be seen that this does not rescind or diminish this appropriation; but it does place it entirely under the power of the secretary or the Building or Executive Committee. By this means it was, it seems, proposed to effect the object of cutting off the library entirely, or nearly so. Accordingly, we find in the specific appropriations recommended by the Executive Committee, and adopted by the Board, for the year then next ensuing, only one thousand dollars of the $15,000 allowed for the purposes of the Institution is appropriated "for the purchase of books and incidentals connected therewith."

Thus have we followed the steps by which the Library plan established by Congress, endowed with a large proportion of the annual income, and confirmed in its position by the Board of Regents, has become at last one of the smallest of the interests of the establishment. We see it, in its fallen fortunes, expected to be content with one thousand a year, instead of its legal possession of twenty-five thousand. Fallen! But surely, it will be said, not this time, without open and satisfactory discussion, and room for deliberation; not this time, without the statement of a distinct issue.

The report of the Executive Committee was presented on the 11th of December, the appropriations recommended were adopted on the 15th, and the resolutions appended to the report were adopted on the 21st of the same month, without, so far as is known, any discussion. The report was not previously printed, nor was the issue understood. The public knew nothing of the plan till long afterwards.

But still the effect and apparent purpose of these movements were not entirely unnoticed, nor were the friends of the library, though paralyzed and scattered, entirely silenced or satisfied. The record of what occurred has not been printed. The result, however, was, that *the next year* the Executive Committee, "on consultation with the secretary *and the librarian*," recommended specific appropriations, *in accordance with the principle of the compromise.*

The specific appropriations were discontinued the subsequent year, and the division of the fund left in the hands of the Executive Committee. For two years afterwards the accounts, as assorted, exhibit an equal division according to the compromise. And when, for the year 1852, the accounts showed that nearly three thousand dollars less had been given to the library and museum than to the other department, it was still asserted, that "if items which might properly be charged to the library and collections were added to this side of the account, the balance up to the present date would be in favor of the active operations." It was not *then* asserted nor intimated that the compromise was not obligatory. This plea was reserved for the next year, now present. On the contrary, it was then contended that the compromise had been observed as far as possible; that "the attempt has been made *in good faith* to carry out the resolution," &c. It was not intimated that a voluntary departure from the compromise could be justified, but acknowledged that *good faith* required its observance. In the previous report the secretary said, "the terms of the compromise have been rigidly adhered to."

But although for some time the division of the fund was made in apparent accordance with the spirit of the compromise, and great pains were taken to make it appear that the compromise had been kept "rigidly" and "in good faith," it began, some two years ago, to be cautiously acknowledged, that the real plan of those who advocated the "active operations," so-called, was still, notwithstanding all that had passed, not to let them remain in contented equality of position, but to make them the paramount interest. It was avowed to have been the object "to render them all, library, collections, &c., as far as possible *subservient* to a living, active organization." The "active operations," so-called, were declared to be "the *only* plan in strict conformity with the terms of the will," "the *only* means of properly carrying out the intention" of Smithson, "the *only* legitimate object of the bequest." "All other objects should be *subordinate* to this, and in nowise suffered to diminish the good which it is capable of producing."

The existence of opposing, or at least somewhat retarding, obstacles, seems to have been occasionally recognised; as—

"It is to be regretted that Congress did not leave the entire choice of the plan of organization to those who were to be entrusted with the management of the bequest." We read of "the expenditures trammelled by restrictions growing out of the requisitions of the charter." The plan of active operations had been "acted upon as far as the *law of Congress and* OTHER RESTRICTIONS would permit." It is declared "unwise to hamper the *more important* objects of this Institution" by gathering a library and museum. "The only regret which can be entertained (say the Executive Committee) with regard to the present condition of the Institution is, that the funds are so encumbered with the restrictions imposed upon them by the original charter, that more of the income cannot be devoted to the publications and other active operations."

Thus far, allegiance to the charter seems to have been in some sense felt. It seems to have been acknowledged, that anything more for active operations than had been given, under the compromise, could not, without violation of the charter, be had. Regrets, deep and frequent, are uttered that it is so—that Congress had so *trammelled, hampered, and restricted the only legitimate object* of the bequest. But the real existence of these restrictions, and their binding force, were not *then* denied.

At last—this year—the fullness of time having come, it is ascertained that all hesitancy, on account of trammels, hampers, and restrictions, has been merely superfluous. There exist, in reality, no such impediments!

"In the act establishing the Institution, [say the committee,] Congress carefully and wisely forbore to fix the amount or proportion of the annual income which should be appropriated to any of the objects mentioned in the fifth section. They did not even determine or limit the sum which should be expended on the building, nor have they in any manner indicated that prominence should be given to any particular means or instrumentality for increasing and diffusing knowledge. All this they have left to the discretion of the Regents, to whom they entrusted the conduct of the Institution."

This, it will be perceived, is precisely the doctrine which was originally discovered by the Organization Committee, and promulgated in the second publication of their report. It reached its full development and force just in time to prevent the expenditure of the appropriation of

$20,000 on the library. It seems to have met with a rebuff, and now it claims to be reinstated, *just before the completion of the building*, and in time to prevent the benefits to the library, from the installation of the compromise in full operation.

The committee seem to intend to imply that the other objects introduced under the discretion of the Regents, and which were not mentioned in the charter, have received but a very small proportion of the income. They say:

"Of the entire amount expended from the commencement of the Institution, a little less than one-eighth has been given to researches and publications. The rest has been applied to the special objects mentioned in the act, and to the general expenses of the Institution."

The "entire amount expended." Amount of what? Of the income? No; but the whole amount of disbursements, including those for the building and grounds. Nearly five-eighths of this entire amount have been expended on the building.

Here are the figures:

The full account of all expenditures from the beginning of the Institution to the end of the year 1853, compiled from the statements of the Executive Committee, is as follows:

1. Building, Furniture, and Grounds		$244,393 00
2. General Expenses.		
Expenses of Regents and committees	$4,491 45	
Lighting and heating	1,969 97	
Postage	1,823 36	
Transportation	5,499 15	
Stationery	1,036 28	
General printing	3,100 05	
Apparatus	5,856 07	
Incidentals, general	14,626 02	
Salaries, general	26,839 51	
Watchmen	367 00	
		65,608 86
3. Publications, Researches, and Lectures.		
Smithsonian Contributions to Knowledge	$26,566 64	
Reports on the progress of knowledge	3,609 77	
Other publications	2,962 96	
Meteorology	6,891 55	
Computations	1,050 00	
Investigations	425 00	
Pay of lecturers	4,599 05	
Illustrations and apparatus for lectures	1,300 68	
Attendance and lighting for lectures	812 39	
Salaries, publications, &c	2,050 00	
		50,268 04
4. Library, Museum, and Gallery of Art.		
Cost of books	$11,972 66	
General catalogue	1,428 68	

Copyrights	$284 66	
Stereotyping and printing	2,623 70	
Incidentals to library, binding, and clerk hire	6,403 47	
Salaries, library	12,249 74	
Explorations for museum	450 00	
Expenses of collections	1,366 14	
Cost of transportation	103 00	
Incidentals of museum	1,324 78	
Salaries of museum	6,249 86	
Gallery of art purchases	183 30	
Incidentals of gallery of art	117 25	
		$44,757 24
Total of all disbursements		405,027 14

If we examine these accounts more carefully, we shall arrive at more satisfactory and instructive results than the bald statement of the committee discloses.

If we deduct what has been expended upon the buildings, (for which a special appropriation was made by Congress,) we shall find a balance representing all that has been expended from the beginning, for the salaries, current expenses, and purposes, $160,634 14.

If we examine the accounts, to ascertain how much of this sum has been expended *upon purposes provided by Congress* which were to receive the whole income, we shall find expended:

For lectures, including apparatus, &c	$6,712 12
Library, museum and gallery of art, including all salaries and other expenses	44,757 24
Half of general expenses, (which is much more than would have been incurred had not the active operations been introduced)	32,804 43
	84,273 79

Which gives something more than one-half of all the expenditures (exclusive of those on the building) for purposes sanctioned in the charter. The balance, amounting to $76,360 35, has been expended for objects not mentioned in the act, but excluded from it by direct votes.

But, in looking over the items of "general expenses," we shall find that a great part of these have been expenses which would not have been incurred, had the Institution confined itself to the purposes which Congress provided.

The accounts give us no data for ascertaining the facts on this point with accuracy. We cannot but suppose, however, that much more than half of the expenses for postage, transportation, stationery, and general printing, belong to what are called the "active operations."

But, besides these, there are several items in this list which belong, either wholly or nearly so, to the department of publications and researches.

Apparatus $5,856 07

Apparatus for lectures is separately charged; this, therefore, is apparatus for *researches*, and should be charged under that head.

Incidentals, general..... 14,626 02

Nearly one-fifth of all the charges under general expenses is included in "incidentals, general." It is impossible to tell what this means. There could be nothing like such an amount thus chargeable, had the Institution been conducted on the plan marked out for it by Congress.

Salaries, general..... 26,839 51

This means the salaries of the secretary and his clerks, nearly the whole of whose time has been devoted to the publications and researches. It should be remarked that under the head of library and museum all the salaries for these purposes are reckoned, but nearly all the salaries for publications and researches are placed under "general expenses."

If corrections were made, so as to show exactly what the publications and researches have cost, it would be evident that far more than half of the expenditures (exclusive of those on the building) have been made on their account.

But my task, though already it has proved a long one, is not yet wholly done. The committee have disputed the right of the library to partake, as an independent and important object, in a fund bequeathed for the increase and diffusion of knowledge among men. They can tolerate it only as an unimportant adjunct of something else, which they esteem a more legitimate object of the bequest. A few words must be said for the disinherited library, even though they should serve but to pay a last sad tribute of respect and affection to a noble American *idea*.

The committee say:

"To describe a library as an institution 'for the increase and diffusion of knowledge among men,' would be a preposterous abuse of terms.

"It would be the *hiving* of knowledge, not its increase and diffusion.

"The accumulation of books in the political centre of a great country, or even in the centre of population of a numerous people, would no doubt gratify the pride of the nation, and be attended with some profitable results; but such a library would not insure mental activity to inquirers who should live remote from its locality, and its relation to all increase of knowledge would be merely incidental."

If Congress did, as we have shown, establish the library as the paramount interest of the Institution, the charge of abusing terms, of not understanding the relation of a library to knowledge, is of course directed against them.

It may indeed be said that whether the charge be just or not makes no difference, inasmuch as what they established must stand; or if changed, it must be in one of two ways—either by nullification and violation of law, or by new action of Congress, who reserved to themselves the right of altering and amending the charter. The former course will not, we suppose, be openly advocated. An appeal to Congress may legally be made. They may be told that they entirely mistook the design of Smithson when they gave such prominence to the library; that

they entirely misunderstood the real uses of a library, and its relation to the increase of knowledge; that others have perceived this error, and, knowing something more to the purpose, have for a time so interpreted the act as to establish this something else, and now come and ask absolution for the past, and the legal sanction of their plans for the future. This *may* be done; Congress *may* be convinced, and *may* yield. But we presume that some members of Congress would not be pleased with such an approach, however plausibly it might be made. The arguments, too, both against the library and in favor of the rival project, would be met, and a third Congressional struggle for a library might end as the others did.

It will never be possible to convince a large number of intelligent and educated men that a library is not an institution for the increase and diffusion of knowledge; that it is the mere "*hiving*" of knowledge, for the gratification of national pride, or even for "*some profitable results.*"

They would see every civilized and enlightened nation on the face of the earth using liberally the public means for the purpose of forming such institutions. They would find the wisest statesmen, the most learned scholars of all classes, uniting in support of public libraries. They would hear regrets, after these libraries had reached a quarter or half a million of volumes, that they were not large enough to meet the wants of investigators. They would see that these libraries in London, Paris, Berlin, Copenhagen, Gottingen, and other cities, were great centres of activity in the increase and diffusion of knowledge. Entering the reading-room of the British Museum, among its 200 or 300 daily readers, they would find earnest investigators, real promoters of knowledge—men who bring out of their treasures things *new* as well as old, who increase as well as diffuse knowledge, and who have gone thither for help in their work. They would there, and in other great storehouses of knowledge, find scholars from all parts of the world, pursuing their various courses of investigation.

But it is not necessary to rest in faith upon the settled conviction of every civilized people. It is easy to demonstrate that this concurrent testimony of all the learned rests upon solid grounds, and to show *how* it is that libraries are for the increase of knowledge.

To increase knowledge in any department, one must have possessed himself of the knowledge extant in that department. It is possible that a man, not knowing all that had been discovered in the direction of his researches, may yet discover something not known; some steps he may overleap. But such is a rare exception to a general rule. Almost universally, what is known to the utmost limit, is used as the stepping-stone to what is beyond. Knowledge grows by small accretions. Each addition is procured at the expense of toil and time. It is small, perhaps; but no man hereafter can overlook it, as he presses on for greater advancement in that direction. It is not indeed said, that he who would increase knowledge in one department, must know all that is knowable in all departments; but only, that he must know all that is known in the direction of his researches. There are many directions in which knowledge is ever expanding. It may be but a small thing to a man whose researches are restricted to one particular

department, (say electricity,) to learn all that is known on that subject. All the books needed may be but a few volumes, to prepare him for a course of researches for increasing that kind of knowledge; and the opposition to large libraries generally comes from those who can thus easily acquire the means of commencing and continuing original researches. But let such an one be reminded, that electricity is not all of knowledge; that chemistry is not all; that all the natural sciences, and all the physical sciences, do not comprehend all of knowledge, which is to be increased and diffused. There is mathematical knowledge, there is historical knowledge, there is legal knowledge, there is knowledge of government, knowledge of statistics, knowledge of geography, knowledge of medicine, knowledge of man in his intellectual and moral character and relations, knowledge of languages, knowledge of art, knowledge of the practical applications of science, of agriculture, commerce, and mechanical arts, and knowledge in infinite varieties of form and name. In all these, knowledge may be increased.

We are prone to draw our analogies too much from the physical sciences, when we think of the increase of knowledge. So great has of late been the progress of physical science, and so beneficial have been its results upon the material condition, and indirectly upon the moral and intellectual condition of the human race, that it is ever present in the thoughts. It is visible and palpable. Progress in it is readily recognised. It *seems*, therefore, more real than progress in other directions; but it is not more real than any other knowledge, not merely speculative.

All knowledge is worthy of support. All knowledge is to be increased. And although one *increaser* may need in his efforts but few books, yet the aggregate of those needed by all must necessarily be large.

One very important branch of knowledge, for instance, is that of American history. The man who, tracing it from the earliest discoveries, through all the colonizations, and all the peopling, and all the events which have developed our institutions, might deduce, with certainty, laws and principles new to the world, and which would greatly promote its progress in civilization, would be increasing knowledge in that department. But to do this, it would be necessary for him to have access to at least 25,000 books in that department of research. He could not find these books in all the public libraries of America combined. They would not enable him to make this contribution to knowledge. For a thorough investigation of English history, with a like purpose, there might be required three or four times as many books; so too of French, of German, and of other histories.

To us history is of peculiar importance. A new people, working out the greatest problem of time—the true theory and practice of self-government—we wish to examine history for ourselves. We know that it has been tortured to teach doctrines which we have disavowed and rejected. We wish for access to the sources of history, that we may form our own independent judgment; we wish to re-write it from our own stand-point. Our children and the waiting world are to be taught to read history aright. Our free institutions are not the offspring of ignorant blundering, and sciolistic rashness. Our fathers—the Jef-

fersons, the Adamses—were men of study and thought. They had passed portions of their lives, like recluses, among books. And so, earlier, the first colonists were men of education and study, and they brought libraries with them to this far-off western world. The doctrines developed here are destined to spread—not by sudden outbursts of enthusiasm—not in the wild tramp of revolutions—so much as by the silent influence of what thinking and studious men will write and speak. We need the books to aid our students in this noble work.

History is indeed a large department, and he who cultivates it must have *many* books. Other branches, too, require each its quota; one may be satisfied with a few, another require many thousands. If we suppose ourselves providing a library for a hundred investigators in different directions, the average number of books, for each, different from those which others might need, (not to read through, but to consult,) might be 5,000: the whole number of books necessary to meet the wants of these hundred investigators would then be 500,000; and thus we should require the large library.

But, again, knowledge acquired is essential to the increase of knowledge, not only as the necessary stepping-stone or point of support, but also in furnishing analogies, and indicating the direction in which new knowledge is to be sought. Efforts must not be projected at random into the unknown. They must, to be successful, be directed by a previous acquaintance with what has been discovered, and the manner of its discovery. The greatest discoveries are made by men whose minds have been trained to the work, by studying the analogies of past discovery.

To say that a library is not for the increase of knowledge, is to say that the existence of knowledge is not essential to its increase; that the past is nothing to the future; that all now known may be blotted out, and yet the progress of knowledge continue. The mere statement of such a proposition is its refutation.

As to the relation of a library to the diffusion of knowledge, little need be said. To it would be attracted those who wish to learn for themselves, and especially those who wish to learn that they may teach. The lights (as has been said) kindled here, would shine upon a thousand hills. The book-makers, the lecturers, the teachers, would come here to spend their studious weeks, and gather that they might distribute.

For diffusiveness, what other instrumentality can compare with this?

There is a fallacy lurking in the language of the committee when they say of the library, "It would not, of itself, add to the sum of human knowledge." Of itself, neither would it diffuse knowledge. Of itself, it could do nothing. Neither could any institution, corporation, or establishment, *of itself*, either increase or diffuse knowledge. Corporations, institutions, libraries, are mere means, instrumentalities, facilities, incitements to individuals, who, as individuals, in the exercise of individual intellect, increase knowledge. In this regard, therefore, a library stands in precisely the relation to knowledge that a learned society does. Both are means. Neither is capable of effecting the end, *of itself*. The observation of the committee, in the same sense, and in a like degree, is applicable to the plan which the report proposes to establish.

But, among the means, the most important of all, and most wanted in this country, and at this time, is a great library. We have the means of education, of discipline in schools and colleges; we have active minds, and active presses, and far greater facilities for spreading among men whatever we can do to promote knowledge, than are enjoyed in any other country. But we have not books. The public libraries of this country do not furnish means for extensive study in any department. Not one of the truly learned works which have been produced by our countrymen has been, or could have been, written by the aid of our public libraries alone. Works like Irving's Columbus, Wheaton's History of International Law, Prescott's works, Ticknor's History of Spanish Literature—even works relating to our own History, as Bancroft's History—cannot be written from the collections in our public libraries. The "American Archives" could only be compiled from a library of some 25,000 volumes, collected at his own expense by a private individual, and which yet remains private property. There is, perhaps, no one subject that can be fully and satisfactorily investigated in our public libraries. We need one large library, at a central and convenient point, accessible freely to all who wish to consult it, and supplied with the amplest materials for research.

Such a library would afford, to the poor as well as to the rich, the facilities of learning. It would be eminently democratic.

The rich, for the most part, are now our learned men; those who can go to Europe to consult the libraries of the Old World. Had we our library here, the citizen of the most distant of the thirty-one States could come here more easily than he could go to Germany. The question with him now is, shall I go to Europe or give up my investigation? The question then would be, shall I give it up or go to Washington?

A large library must have a local habitation somewhere. Wherever it might be, it would be visited by the studious. But there is no place in this country so favorable for its location as Washington. The facilities of communication with every part of the Union are greater than for any other place. This is the only place in the Union with which every citizen would have, at all times, the means of free communication. A citizen of a distant State, desirous of ascertaining facts to be learned only in a large library, might know of no person in New York or Boston to whom he would feel at liberty to write. But in Washington there is, for a great part of the year, the representative from his district, of whom he could readily seek assistance, although not personally known to him, in procuring the information he might need, to any reasonable extent.

There are other reasons why such a library should be in Washington. It must be connected with the government. The publications of the government would constitute a most important portion of such a collection. These could not so well, if at all, be gathered elsewhere. A large proportion of researches to be made connect themselves with the government archives, and these archives cannot, of course, be removed from the capital. Again, the collection of American publications, which will hereafter be so much desired by investigators, cannot possibly be made, except by the aid of the government, through the copyright law; and it is manifest that this collection should be preserved

at the capital. Besides all this, the fact of this Institution being metropolitan, and connected with the government, makes it, so far, a national establishment. To such an establishment would be attracted more of the donations and bequests of private collectors, of books, specimens and works of art, than to any other. From this source, it is to be expected that the library, if once placed in the prominent position which Congress intended it should hold, would rapidly rise to the first rank among the literary storehouses of the world. Had the whole sum which Congress allowed and intended for the library been expended, we should have had at this moment a library of nearly or quite 200,000 volumes. The money for the building was specifically appropriated for it by Congress, and might have been used at once for the purpose. A building expeditiously finished and filled with the stores of learning, produces an impression upon our rapidly moving countrymen. There is something to see. If money has been expended, there is something to show for it: there is property. It is but an investment, and one would easily be convinced that it is convertible property, which could be changed back again into gold. It would not seem like water spilled upon the ground, which cannot be gathered up.

It is desirable, in the management of a public institution, not only to make progress, but to *show* progress. Popularity depends upon it; and popularity, though not to be sought in dereliction of principle, or neglect of other means of utility, is not, in this country, to be despised.

Again, it may be truly said, that whatever might be the future course of the Institution, the library would be essential to its greatest success. Should we make it the seat of a learned society—such a society needs a library, and a very large one, for its greatest efficiency. Should it be devoted, in turns, to varying specialities—each would find in the general library one of the principal instrumentalities for effecting its purposes. It would find in this a part of its plans provided for.

There is another reason in favor of the library plan which deserves to be mentioned. It is, that it would be locally as well as diffusively beneficial. It would be of great advantage to the city of Washington. It would draw inhabitants of the best class, who would either settle permanently here, or would make long and frequent visits hither, in order to consult the library; while, as already shown, it would be beneficial to the whole country, and to all men. Thus while it would meet the apparent design of the testator, that its benefits should be free among men, it would, being founded at Washington, be more beneficial to the city than if it were exclusively for the city. Congress, therefore, would have done no real or constructive wrong in accepting this trust, as the guardian of the District of Columbia.

It is proper, here, to enter into some examination of the objects and operations which have been introduced to the displacement of the library, and to which it is now proposed to devote nearly the whole income.

It has already been shown that there is no warrant for them in the act of Congress. Not only so; it has been made manifest that they were proposed to Congress, and distinctly and emphatically rejected It has further been shown that they were re-introduced and brought into their present ascendancy without public, open and full discussion

Now, however desirable and necessary they may be in themselves, they are less desirable and less necessary than the observance of law, and the cordial consent of those who advocated and helped to establish the Library plan. When Congress had advisedly determined on something else, how strong soever the reasons against what Congress ordained, and in favor of these other measures, the law must prevail. Upon Congress rested the responsibility of the selection of objects. These objects must not, under any plea whatsoever, be changed, without making the issue fairly and openly *before Congress*, and abiding by their decision.

The case might be rested here; but the wisdom of Congress has been questioned in this matter. It may be, and it ought to be, vindicated. This has been already done. But it must be done, if necessary, the fortieth time.

What, then, is the other plan? It is briefly this:

To publish, mostly in quarto form, and with elegant illustrations, works supposed to contain positive additions to knowledge.

To institute researches in physical science, and publish the results.

It originally included the offering of prizes for the increase of knowledge. But this part of the plan has never been put into operation.

But few researches have been instituted, except the gathering of data for meteorological investigations, and the employment of competent talent for reductions, which for some reason have never been published.

The principal object of attention has been the publication of works, in a series called "Smithsonian Contributions to Knowledge." These are elegantly printed and superbly illustrated works. They have been distributed to the learned societies, and large libraries of the world, there, according to the doctrine of the committee, to be "*hived*," and to sustain only an *incidental* relation to the increase of knowledge. It is not questioned that among them are works of great value, nor is it proposed here to criticise any of them, as to their scientific or literary merits.

The committee inform us that the success of the plan "is acknowledged by *all who are capable* of forming a correct estimate of its results." If, then, one does not acknowledge the success of this scheme, he is thrust by the committee into the category of incapacity.

It may yet be that this plan may be discussed by some of those bold and daring spirits, who may be found ready to brave the sentence of excommunication from the society of the learned and the capable, in the discharge of a public duty.

It is doubtless true, however, that no accessions to knowledge, contained in these volumes, would have been lost to the world, had the Smithsonian fund not been devoted to its dissemination. They would all have been published, some in journals, or transactions of societies, and some in separate books—not, perhaps, in so elegant a style. The style of publication may not be, it is granted, purely a matter of luxury. A subject may, for its proper elucidation, require costly illustrations; but then the difference between the publication of the books by the Smithsonian Institution, or in other ways, is simply between the best and somewhat inferior illustrations. There is no question here affecting

the increase or diffusion of knowledge. The books, if worth publishing, might have been published in some form. So large has become the number of appreciative men in every field of knowledge, that there is now no danger of knowledge being lost for want of publication. The books which would not pay a publisher for issuing them, in the form which the superior intelligence or vanity of the author may most approve, may, if they contain what is truly valuable, be issued in some other form, or if the form be really essential, the means, it is believed, can always be found.

One principal point to be observed respecting these publications is, that they do not exhibit the activity and efficiency of the Smithsonian Institution in the increase of knowledge. They were, almost all of them, written without aid of the Institution. Individuals made researches, produced results, wrote books, and brought them to the Smithsonian Institution to be printed and distributed. The increase was in most instances made before the connexion of the Smithsonian Institution with it began. The relation of the Smithsonian Institution to this knowledge, therefore, is not that of the *increaser*, nor of the *furnisher* of stimulus for increase, but of the *distributor*. How, then, can these books justly be called "*Smithsonian* Contributions to Knowledge?" If contributions at all, they are the contributions of the individuals who made the researches and wrote the books, and not of the Smithsonian Institution, which merely publishes and distributes the books.

They are Smithsonian Contributions just in the sense that the publications of the Appletons, Putnam, and Lippincott may be called—Appletonian contributions to knowledge, Putnamian contributions to knowledge, or Lippincottian contributions to knowledge. The relation of the Institution to knowledge, except where it procures its production by paying men for making researches, is precisely that of a publishing house, and no other. The only difference is in the degree of credit obtained for the work.

And this leads to another point in the argument. The Smithsonian Institution, being connected with the government, located at the capital, and endowed with large funds, has a position so commanding and imposing, as to give to every thing which it does great importance in the eyes, not only of our countrymen, but of the whole world. If it devotes itself to scientific researches and publications, it of necessity becomes the type, representative, and arbiter of American science. If it proposes to produce the same results as the French Institute, or the Royal Society, it at once assumes in the eyes of all, the position of a great American society and institute of sciences. If its operations be good and efficient, they are conspicuous, authoritative, imposing. If they be feeble, they are indeed conspicuous, but give an unfortunate representation of American intellect. If wrong, the sanction of all this high position is given to falsehood or the suppression of truth.

It becomes us, then, to ask in all seriousness, are we sure that we can so control these efforts that their issues may be good, and only good, and that continually?

It should be noted, that the regulation of scientific and literary affairs is always a difficult and delicate matter. All the interests of truth may be crushed and ruined by an incompetent or prejudiced arbitration.

Individual injustice may be done. Some Galileo may not only not receive the aid which he needs to establish the truth; he may not even be left alone to promote the truth, but he may be obliged to struggle against the towering and overpowering influence of this Institution.

It is indeed a great and fearful responsibility to be the arbiter of science. And consequently the experience of mankind has led them to place such power only where it can be safely guarded, where it cannot be used to suppress truth and propagate error. It is of much less consequence that the truth should be positively helped, than that it should be protected against discouragement. The truth will find its own enthusiasm and encouragement; but let it not be retarded; let no authority be established to promote it, which may become a powerful engine for its repression.

The experience of mankind has shown that the interest of science can be most safely entrusted to its own devotees; to voluntary associations of such of its cultivators as will know how to combine a zeal for its promotion with a due regard to their own advancement and reputation; to associations which will afford opportunity for free discussion among experts, for the conflict of opinions, for the struggles of truth.

Such operations as have been commenced in the Smithsonian Institution have been heretofore, and elsewhere, entrusted to such societies with eminent success. In proportion as the decisions of such societies would carry with them weight in the scientific world, have the steps for arriving at the decisions been carefully guarded. In the Royal Society of London, for example, frequent meetings of members are required to be held, once a week during a good part of the year. The papers which are read are open for discussion. They are then required by the by-laws to be referred to the council, composed of twenty-one members, elected annually, ten of whom must be new members, and eleven members of the preceding year. This council are required to examine the papers, and to vote with formality upon their adoption or rejection. This is for the double purpose of preventing any new truth from being rejected unjustly, or any error, through personal influence or favoritism, from receiving the sanction of the society.

Now, let it be asked, what have we, in the organization of the Smithsonian Institution, to meet these requirements, to secure the good aimed at, and avoid the deprecated evils?

The "Establishment" or "Smithsonian Institution" proper, is composed of the President and Cabinet, the Commissioner of Patents, and the Mayor of Washington, with such others as they may elect *honorary* members. This is not surely a body of men for conducting the affairs of a learned society. The members to be elected are to be *honorary*, not active members. The charter creates them "The Smithsonian Institution," "with the powers, limitations, and restrictions hereinafter contained, *and no other*." If we inquire what powers, &c., are contained in the act, we find in section 8 the following:—"That the members and honorary members of said Institution may hold such stated and special meetings for the supervision of the affairs of said Institution, and the advice and instruction of said Board of Regents, to be called in the manner provided for in the by-laws of said Institution, at which

the President, and in his absence the Vice President, of the United States shall preside." Such are the powers, and *all* the powers, contained in the charter. This is a visitorial board. They are supervisors. There is no provision whatever for the exercise of the functions of a learned society.

Let us look, then, at the constitution of the Board of Regents. They are appointed to conduct the business of the Institution. They are fifteen in number. The Vice President of the United States, the Chief Justice of the Supreme Court, and the Mayor of Washington ex officio, three members of the Senate, and three members of the House, and six other members, two of whom are to be members of the National Institute, and resident in Washington, and the other four citizens of States, no two for the same State.

Now, if we look at the constitution of this body, we shall find that nine of the fifteen are not selected on a principle which would secure the kind of service for a learned society. They are necessarily business men, occupied, engrossed with other cares and labors, holding this office generally for a short time, and unable to give to it more than a brief and passing attention. The four members from the States are scattered, and can attend (and as a matter of fact have attended) the meetings but very seldom. There are two members from the National Institute, it is true, and resident in Washington; but these, too, are absorbed in other business, and however eminent as scientific men, we must recollect that Congress were unwilling to entrust the scientific management of the Institution to the whole of the National Institute in its palmiest days.

It is manifest and indisputable that, if this scheme is to be pursued, it must be under the care and labors of the officers alone. The Secretary and *his* assistants are to perform the work of the Royal Society. The controlling power over the scientific and literary affairs of this country must be entrusted to the hands of one person. It is difficult in treating this part of the subject to escape embarrassments which might have been avoided had a discussion been had, as it might and ought to have been had, before appointments were made. Thus much is certain that, however, from motives of delicacy, this subject may be for the present passed over, the time must come when such motives will no longer operate.

It must be under the management of one man, unless the whole scheme of the Institution be changed by act of Congress. Such a tribunal could not long continue to be acceptable to the scientific men of the country. The few particularly benefitted might have influence to sustain it for a time; but the man never lived, and never will live, capable of conducting such a system of operations satisfactorily.

It is too remote from the knowledge and sympathy of the great body of even educated men to awaken general interest. It appeals directly to the sympathy of but a very small class. The only interest which others have in it is to receive gifts of publications. This will, indeed, prevent some complaints which would otherwise be made; but not permanently.

It makes no demonstration before the public. It looks like an affair of the closet, and such in truth it is. The public are ever asking

what is done here. If we point them to a pile of books, printed copies of which have been distributed, we are met with the question, did you write these books? Did you institute and pay for these researches? No, but we published the works, and thus encouraged authors. Then this is a publishing house, and it is immediately compared, to disadvantage, with those of the Harpers, the Longmans, the Didots, Brockhaus, and Cotta. This scheme, it is said, requires no costly building—a hired room is enough. The building it is proposed to sell. The great Smithsonian Institution is to become a bureau. This will not suit the public.

It will not suit the citizens of Washington, who have a peculiar interest at stake. If all the funds of the Smithsonian Institution are to be expended in publishing books, which merely bear the imprint of Washington, the city gains but the poor advantage of having its name placed upon the title page of certain books, and that too on false pretences, for the books are to be printed elsewhere and distributed elsewhere. It seems plain, therefore, that this scheme cannot permanently prosper, as the principal purpose of the Institution, under its present organization.

But if this thing is to be persisted in, let it be done legally and fairly. Ask Congress for authority. The friends of the Library plan had a right to expect, when the charter was granted, that they should not be compelled again to compare it elaborately with other plans; and particularly, that they should not be called upon to do so, here and now, when all that they may say against other schemes may be interpreted in a personal sense. But if there must be another Congressional struggle, let it come. If the Library plan, notwithstanding what has occurred, is this time overthrown; if Congress, the competent authority in the case, changes the law so as to allow of these schemes, the friends of the Library plan will not attempt to reinstate it except by open and manly discussion.

It is idle for us to think that, out of politeness to each other, it is better to hush up this matter; it is idle for us to shrink from the imputation of implying censure by withholding a full approval. The sanction given by the Board of Regents in this matter is, thus far, only *constructive*, except so far as the compromise goes, and that, as has been shown, was adopted without any open discussion of its legality. When these facts are known to the public, as they are likely soon to be, the whole proceedings of the Board of Regents will and must be canvassed. The responsibility cannot be evaded, nor can blame, where it is due, be avoided. The power and influence which should establish what is legally wrong can neither forestall nor overawe the judgment of the world of letters and of posterity.

There is one other topic to which it is painful but necessary to advert; namely, the proper organization of the several departments, or (if there be anything objectionable in that word) branches, or objects or purposes of the Institution, and the definition of duties and of position of those who are engaged in connexion with one or the other of these purposes.

The Report takes the ground that the Institution should be "*a unit in plan and a unit in purpose.*" The secretary is to be the centre and source of all responsibility, authority and action. The *government* is to

be A UNIT. There are to be no by-laws, defining the position, the duties, the authority of the several officers. They are to take their law from the lips of the secretary alone. The occasion of uttering these doctrines, (which will sound so strangely in the ears of Americans, and of citizens of the republic of letters everywhere,) is intimated to be, suggestions that the "assistants" should be made independent of the chief. If any such proposition has been made, it has been without the knowledge of the undersigned.

The officers of the Institution,—educated men, men of mature age,—were taken from professorships in our first colleges, to perform, as they thought, certain honorable and responsible duties, for which they were supposed to have a particular aptitude. They went on for years, discharging their duties quietly, and, so far as appears, satisfactorily. At last a plan is proposed which, in its operation, is to affect very seriously the interests with which they are particularly connected, and to affect themselves personally. They have a right to expect, and to say, that this ought not to be without a fair understanding of the case, and without distinct authority of the Board of Regents. But, on the other hand, it is contended that they must take their law entirely from the secretary, whether it be in accordance with the law of Congress, the preceding action of the Board of Regents, and their own rights, or not. They are, at all events, and in all things, to harmonize with the secretary; *the "government" must be a unit.*

The doctrine of Americans will be, that the officers of the Institution should harmonize with each other *under the law*, and not otherwise. Those who cannot abide by law, if such there be, are censurable for the inharmonious action which may ensue.

HARMONY UNDER LAW is what ought to be aimed at and enforced.

There are grave questions in this connexion, as must be seen by any one who has attended to what has already been said. Are we—the Regents appointed by Congress to conduct the business of this establishment—to leave questions relating to the proper interpretation of the law for the officers of the Institution to quarrel over? Or can we suppose that we do our duty by submitting them entirely to the arbitrary decision of one officer? No! *we*, under the advice and instruction of the Establishment, are to settle the meaning of the act of Congress, and to organize the Institution so as to secure harmony under law, and not to leave harmony to be secured by coerced obedience, in all things, to one will. Harmony may be secured by having one officer—by driving out all purposes but one, and all officers but one. But is this the kind of harmony which we want? Is this the course which the American people will approve?

In this matter alone the committee are strict constructionists. They appeal to the language of the 7th section, but without considering it in connexion with the rest of the act. Let us see how strict construction will answer their purpose.

The secretary is required to "discharge the duties of librarian, &c." This he has never done. It is not said that he is *to be* the librarian, but that he is to *discharge the duties* of librarian. This he might have done, had he had no other duties but that of secretary, as those duties are defined in the act, and as Congress expected them to be. But

other duties were required by the Regents to be performed by the secretary, incompatible with his discharging the duties of librarian. A librarian was appointed, to act as librarian; to discharge the duties of librarian; to be librarian. The name of the librarian under the law is "Assistant Secretary," but his duties are those of librarian. He is the librarian. He was nominated, not on the suggestion of the secretary, but by requirement of the Board.

The resolution reads: "That the secretary be requested now to nominate to the board an assistant *who shall be the librarian.*"

The duties of librarian and those of secretary were thus separated. Their legal names are "Secretary" and "Assistant Secretary." Their duties are those of secretary and of librarian.

Whenever duties are divided, and gentlemen of education and independence of character are placed in connexion with each other, performing each a portion of previously united duties; they ought to be told distinctly what their relative positions are, and for what they are responsible.

Such is the dictate both of experience and of common sense.

Why should there not be by-laws to this Institution as to every other of the kind, the world over? Because those who have all the power do not wish them. But why are laws ever provided? For the protection of the strong? They need none.

If the weak do not desire laws, they *may* not be needed. But if the powerful oppose law, oppose everything that would tend to circumscribe their unlimited sway, that fact alone is sufficient evidence that laws *are* needed.

The act to establish the Smithsonian Institution contains no provision for the enactment of by-laws. A provision contained in the act, while under consideration in the House of Representatives, was stricken out.

A power to make by-laws is, however, an incident to all corporations. The act itself recognises such a power, by its mention of "the by-laws of the Institution." It is to be remarked that this mention occurs only where the act provides that the meetings of the "Establishment" are to be regulated by them.

It is therefore apparent that the power to make them resides exclusively in the corporation, "Establishment," or superior power, called "the Smithsonian Institution;" for the inferior power cannot make laws for the government of the superior.

Under these circumstances, it may be expedient that such communication as may be convenient in the premises be made to the members of the "Smithsonian Institution," to the end that order be taken for the establishment of needful rules, regulations, and by-laws for the government of the Institution, and the persons employed therein.

In concluding the present report, the undersigned, believing, as he does, that the compromise, so called, was unauthorized by the law, does not object to the passage of the resolutions reported by the committee, provided that the following be added:

Resolved, That a compliance in good faith with the letter and spirit of the charter of the Smithsonian Institute, requires that a large proportion of the income of the Institution should be appropriated "for the gradual formation of a library composed of valuable works pertaining to all departments of human knowledge."

Resolved, That the expenditures for the library shall be made under the direction of a "library committee" of three members, to be annually elected by the Board of Regents, from members not upon the executive committee, or upon other committees which may be appointed to superintend the affairs of other departments or objects of the Institution.

Respectfully submitted:

JAMES MEACHAM.

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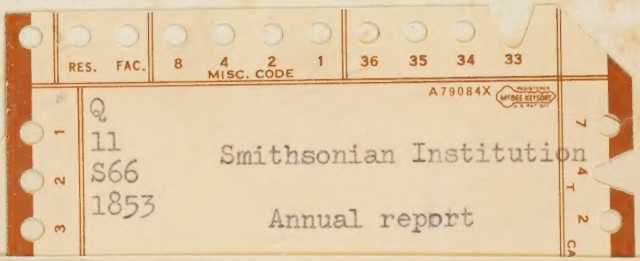
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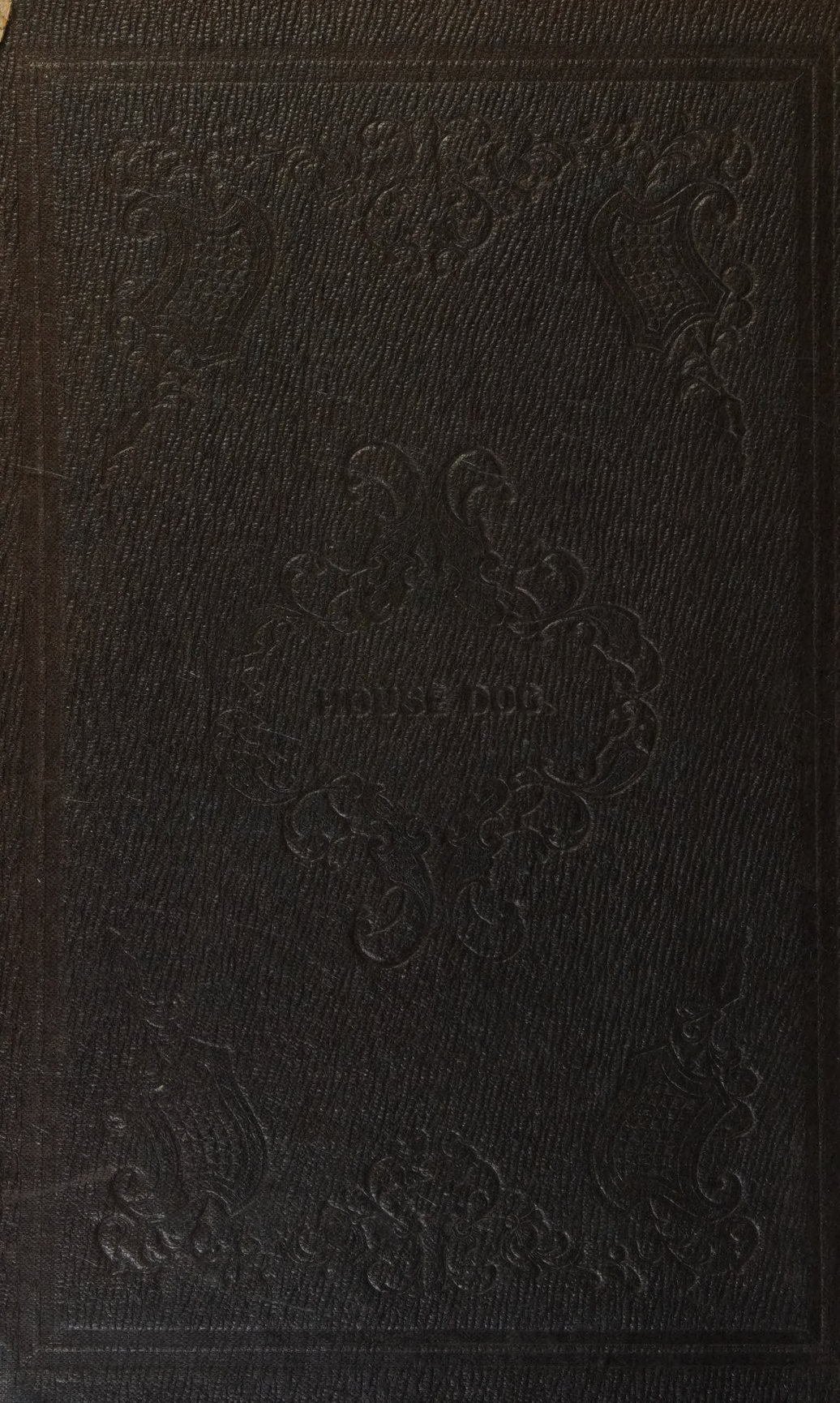
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